CHEMICAL AGE

OL. LVIII 3 JANUARY 1948 No. 1486

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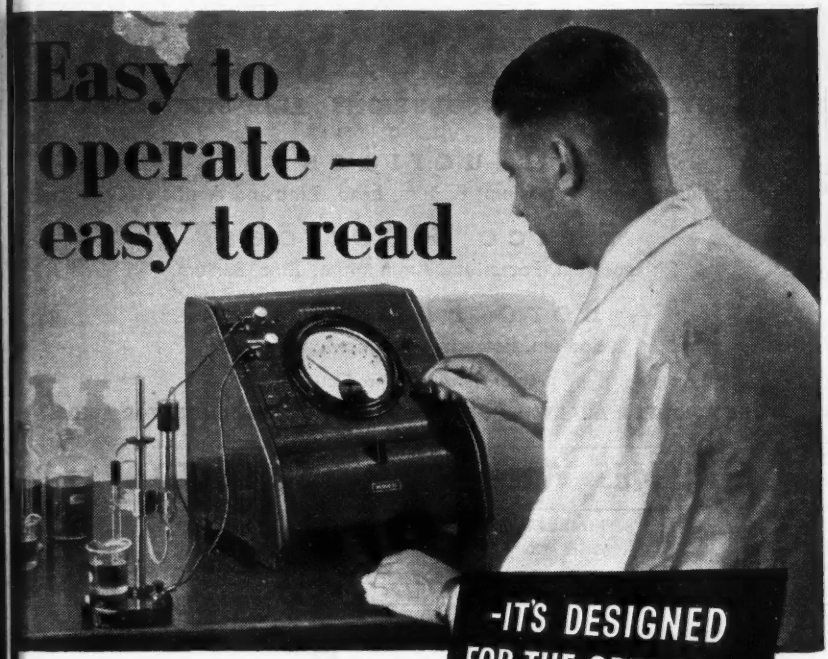

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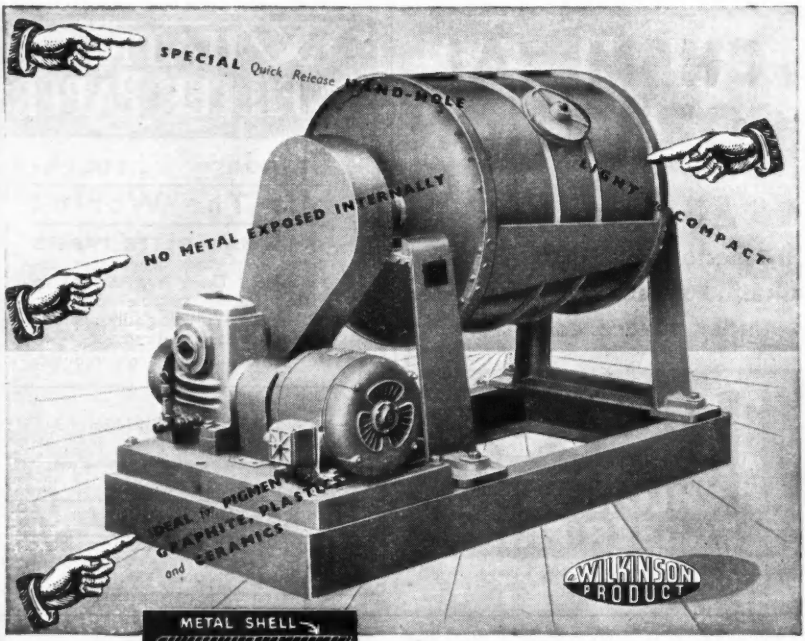

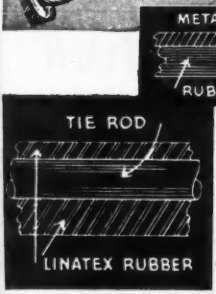

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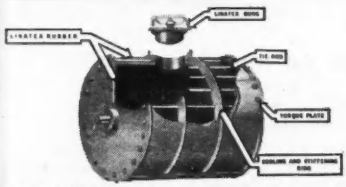

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The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Telegrams: ALLANGAS FLEET LONDON **Telephone: CENTRAL 3212 (16 lines)**

SCOTTISH OFFICE: 116 Hope Street, Glasgow (Central 3970)

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THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers Limited

VOL. LVIII **No. 1486.** 3 January 1948 **Annual Subscription, 26s. 8d. per copy; post free, 10d.**

Lecturers in Technical Colleges

NOT long ago we were with a chemical engineer who has attained a position of considerable responsibility. In conversation he related how in his youth he had been a lecturer at evening classes in what passed for chemical engineering in those days. For this he was paid twenty-two shillings and sixpence a night. He mentioned several now well-known names as being those who attended his class. "But how," we asked, "had you the nerve to stand up and instruct these men, many of whom had taken their degrees before enrolling in your class?" "I often wonder myself," he replied; "I was only a couple of years older than they were and they should have known more than I—but there seemed to be no one else willing to do it; and anyway we got along quite well."

This conversation was vividly recalled on reading the new salary scale recommended for teachers in technical colleges and institutes by the local education authorities' and teachers' panels of the Burnham Technical Committee. It cannot be denied that the salary scales hitherto ruling have not been sufficient to attract the best men. The evening class pay is, of course, ridiculous. The classes in the evenings are quite as important as those in the daytime. Those who attend them are generally men and women who have worked hard all day and are already tired. They require the very best teaching in order to maintain their interest under these conditions. Those who teach them are for the most part already engaged in works laboratories or offices during the day and may be expected to be men of high qualifications or holding responsible positions. Such instructors must be of high calibre, but top rank men cannot be expected to devote their evenings to do this work for the sort of pay offered. It is a labour of love and is virtually voluntary work.

We are concerned here, however, primarily with the whole-time teachers of technology. Our chemical engineering friend might conceivably have been satisfied with a whole-time lecturing post in his extreme youth, but he would not long have remained a lecturer at the salaries then offered—nor could he to-day. Lecturers in colleges of technology are paid on the Burnham basic scale with a minimum of £300 rising by £15 to a maximum of £525 for men, and a minimum of £270, rising by annual increments of £12 to a maximum of £420, for women. The Parliamentary and Scientific Committee in its recent report on colleges of technology has pointed out that this "basic scale which is offered to lecturers in advanced subjects, who must also usually be capable of research in their subject, is exactly the same as that offered to teachers in primary schools dealing with pupils of the age range 5-11. It is ridiculous to suggest that these scales attract satisfactory lecturers to the colleges of technology. They do not. Many colleges of technology in fact cannot obtain satisfactory teachers upon advanced subjects."

This committee therefore urged the Minister of Education to invite the Burnham Committee to make provision for special scales of salaries applicable to the staffs of selected departments of colleges of technology comparable with those of

On Other Pages

staffs of unversities. A head of a department (or professor) might,, for instance, be paid a minimum basic salary of £1400; a senior assistant or reader, £800 to £1200, a lecturer £400 to £850, with appropriate family allowances. The committee laid down the principle that " not only should the salary of the lecturer in selected departments of the colleges of technology be related to that of his colleagues in the university, *but also to the salaries in industry*."

There can be no possible doubt that this is the only way to ensure that technical colleges and universities are adequately staffed by trained men of sufficiently high calibre. There seems to be no logical reason why the teaching of technology should be regarded as being of less value to the community, as expressed by the salary scale, than the direct application of technology to industry.

Shortly after the issue of the Parliamentary and Scientific Committee's report it was announced that recommendations had been made for increases in salaries of heads of departments, senior assistants, and assistants in technical colleges and institutes, art colleges and schools, to date from April 1, 1948. These are no more than recommendations and they must be submitted to the various constituent bodies and ultimately to the Minister of Education for his approval. The basic scale for assistants, it is urged, should be increased by two increments at the maximum from £525 to £555 for men and from £420 to £444 for women. Graduates would be entitled to an increase of two increments throughout the scale and certain other increments are provided for those who hold a first-class degree at a British university. Scales or senior assistants are increased from £750 to £800 for men and from £600 to £640 for women. There are likewise increases recommended for heads of departments.

From this it does not appear that adequate upgrading of salaries is even contemplated. The recommendations appear to make provision for only a slightly increased salary in the higher grades and not to affect the lower grades, except in that a few pounds extra a year is given to those holding degrees. The whole conception behind these new recommendations appears to perpetuate the age-long principle which permits teaching to be one of the ill-paid professions. We are not surprised to hear that many teachers in technical colleges are determined to reject the proposals as totally inadequate.

The Percy Report, powerfully backed by the Parliamentary and Scientific Committee, contains recommendations for official action to improve technological teaching in Great Britain by extending the scope of many technical colleges and by introducing into them more advanced teaching of university grade in order to bring British technical colleges up to the standard of those operating on the Continent before the war. One of the first needs must be to attract into the technical colleges as teachers men of sufficiently high ability in the technology of their industries. The Burnham Committee should be asked to take a more realistic view of this problem by relating the salaries offered for all grades of teachers, including principals in technical colleges, to those of the salaries ruling in industry. Only the best are good enough to teach those who must later manage and control industry.

NOTES AND COMMENTS

Promises and Pitfalls

SELDOM probably has a year begun with greater contrasts of promise and impediments than 1948. With nationalisation of some comparable industries and impending State control of others, the production of heavy chemicals might well be regarded by those taking the long view as a somewhat hazardous use for capital. Very evidently apprehension on that ground is not widespread, regardless of the "authoritative" pronouncement in America recently that the British chemical industry was "the next on the list" in the nationalisation programme. Proof of that confidence has been provided most convincingly by the alacrity with which the recent very large share issues have been taken up, indicating also that the large potentialities which science and technology have recently placed in the hands of the chemical and some associated industries is widely recognised outside the professions concerned. The chemical industries are in addition reaping the benefit from the large re-allocation of capital resulting from the transfer of other industries to State ownership. But for the restrictions imposed by the official curtailment of capital investment, 1948 would clearly have been for chemical industry a year of unparalleled development, much of which will now have to be deferred. The potentialities and resources, nevertheless, remain, and so swift is the contemporary change and development of the newer chemical techniques that temporary deferment is likely to produce some very solid compensations.

National Research

ALMOST desirable adjunct to a prosperous New Year would be the formation of a national research and development corporation capable of rendering to British industries some of the very valuable services which their American counterparts have long received from their Mellon Institute. The latter, richly endowed by industry, probably has greater freedom of action that a Government controlled undertaking in this country is likely to enjoy, but the achievements of the approximately parallel Department of Scientific and Industrial Research indicate that important benefits can reasonably be expected if the project outlined earlier this year by the Government is fulfilled in good time. The need is not disputed; it remains only for the Government to provide the means, a reminder of which was the letter this week from Capt. Raymond Blackburn, M.P., to *The Times*, recalling that the President of the Board of Trade had undertaken to introduce an enabling Bill this session to set up a national research corporation. The session has ended without reference to the Bill, which, however, need not be taken as indicating that the project to which the Parliamentary and Scientific Committee gave much thought and approval before the official scheme was broached, is to be interred with the less profitable activities of the past year. The Parliamentary and Scientific Committee had in mind the provision of a fund "for the development of any invention or scientific discovery likely to lead to the creation of a new industry or a substantial and beneficial change in any process used in any existing industry . . . "and the establishment of experimental plants and the conduct of experiments to serve the same end. No reflection upon the adequacy of existing research equipment is implied in hoping that the Government will implement some of the Parliamentary and Scientific Committee's ideas before the New Year has lost its novelty.

Premature Prize-Giving

AMONG other New Year resolutions is Mr. Will Lawther's presidential tip to the National Union of Mineworkers that one of their targets for 1948 will be to secure for themselves "pensions from the industry, in addition to those provided by the State." In fairness it must be admitted that he also called on the mineworkers not to let any individual action impair the supply of coal needed by Britain for her recovery. Characteristically, he omitted, in accordance with established trades union practice, to remind his followers that failing a national trade revival, for which coal is an indispensable factor, but not the only one, supplementary pensions will be even more remote than the continuance of even the present standard of living. The habit of putting the cart before the horse is in some circles becoming inveterate.

Plan for Germany

IT will be a happy day for Europe and a relief for the world at large when Germany and German economy no longer rank as news. Any proof needed that that desirable condition is still far from being realised is supplied by the survey issued this week by the International Chamber of Commerce on the economic condition of Germany and its international repercussions, which serves as a footnote to the recent unproductive debates of the Foreign Ministers. Like most other informed observers, the international committee which produced the report, under the chairmanship of Mr. Arthur Guinness, is not at all concerned by the phantom of the former German chemical and industrial "empire." The problem, as other observers have confirmed, is to re-establish the basic products, such as fertilisers, at a bare subsistence level. The committee makes it clear that in its view the progress made since 1945 is frankly deplorable in its inadequacy, and it seems to have forestalled the probable course of events by declaring that government by quadripartite committee should be wound up as soon as possible. The report, written before the disagreements of the Foreign Ministers had finally dissipated any lingering belief in the existence of quadripartite co-operation, strongly urges the establishment of central (but decentralised) German Government agencies and the fostering of exports by all possible means—by increase of raw materials and of individual and communal incentives, foreign investment and free currency. Under present conditions, no German territory has anything to gain by exporting. Remove this artificial barrier to commerce and production, affirms the committee, and the wheels will turn again and Europe will be a healthier and more stable place.

U.K. LIGNITE : 400 MIL. TONS AT BOVEY TRACEY

ADDRESSING the Natural History Society at Torquay on December 23, Mr. C. W. Parish, chairman of British Lignite Products, Ltd., disclosed some interesting facts regarding his company's enterprise at Bovey Tracey, Devonshire, where it was working an old lignite pit which had been excavated a century ago by antiquated methods. Modern open-cast techniques are now being applied.

The Bovey basin, which covers an area of about 24 square miles, and extends from Bovey Tracey to beyond Newton Abbot, contains about 400 million tons of lignite. Operations are at present confined to the north-west corner, where there are thought to be reserves totalling about 50 million tons. The lignite needs to have the adherent clay removed before it can be used to best advantage. Ash content, which is often as high as 30 per cent, is reduced by washing. In this latter connection, experiments have been made at Newcastle-on-Tyne, where about 100 tons of Bovey Tracey lignite were treated in a modern washing plant which reduced the ash content to about 10 per cent.

With regard to the extraction of chemicals, Mr. Parish said that his company's main interest lay in the production of montan wax, which is used for insulation purposes, and in the manufacture of polishes, waxed paper and cartons, etc. Before the war, Germany and Czechoslovakia had a virtual monopoly in the montan wax field, and although the wax content of the Bovey deposits was much lower than that of those in Germany and Czechoslovakia, it was hoped to have an extraction plant in use by next summer. Other possible by-products would include a special type of coke, which may be used as activated carbon.

Reverting to the potentialities of lignite as a fuel, Mr. Parish said a briquetting plant is to be erected at the site. It had been the company's original intention only to market the lignite in form of briquettes. Last winter's fuel crisis, however, had caused a change of plan. In response to a request from a firm of Torquay coal merchants, British Lignite Products enabled the firm to market raw lignite as an emergency fuel in order to relieve the coal position. In one month, 12 tons were sold, and this year's sales had already exceeded 60,000 tons. When the plant obtained for the purpose was installed lignite in briquette form would have its moisture considerably reduced and its burning capacity increased by the use of coal tar as a binder.

U.S. Fertilisers for India

According to Mr. Louis Ware, president of International Minerals and Chemical Corporation, of Chicago, in an address to the New York Society of Security Analysts in New York recently, America expects to send increasing shipments of phosphate fertilisers to India. This was a market, which until recently, American manufacturers had not supplied. Mr. Ware added that Japan had only one small plant in operation.

Fewer Exports in November

£538,000 Reduction of Chemical Trade Returns

ALTHOUGH the value of United Kingdom exports fell in November from the relatively high level reached in the previous month, the fall can be attributed in part to seasonal influences and the total for the month of £102,235 million remains the third highest recorded this year. It is, however, almost exactly £6 million less than the return secured in October. Imports in the same period underwent one of the sharpest reductions recorded this year—by some £23 million to £138.164 million.

The mouth was marked by one of the largest reductions in sales of chemical manufactures, which (exclusive of drugs and dyestuffs) produced a total of £2,871,219, some £538,000 less than was obtained in the same month a year ago, regardless of the consistent upward movement in values in the intervening period.

Most heavy chemicals shared in the general recession in shipments, substantial reductions occurring in the fertiliser totals, of which those for ammonium sulphate and nitrate were approximately halved. Copper sulphate was proportionately more severely reduced at 823 tons. Despite the consistent small improvement in colliery figures, shipment of practically all coal-tar products was in much smaller bulk; benzol, tar oil and associated products having been reduced by approximately half. Cresylic acid also totalled only 198,886 gal., against 266,209 gal. a vear ago and naphthalene 1826 cwt., compared with 3206 cwt.

The same trend was shown by most other chemical products, notably the potassium compounds, sodium sulphate, and synthetic nitrate, chromate and bichromate and the metallic salts. Tin oxide, for example (376 tons) reached only approximately 25 per cent of the November, 1946, total and zinc oxide (522 tons) showed a 60% reduction.

The total figure would evidently have been very much less satisfactory had it not been for the relatively steady levels preserved by sales of salt and some of the sodium compounds. Although salt, sodium carbonate and caustic each underwent some reduction in bulk, it is significant that the total value of the three products, exceeding £390,000, was markedly higher than the return produced a year ago.

CHEMICAL EXPORTS

	Nov., 1947	Nov., 1946
	Cwt.	Cwt.
Citric acid	375	889
Formic acid	3,352	3,832
Tartaric acid	1,618	108
	Tons	Tons
Aluminium oxide	25	36
Alumina sulphate	1,595	2,964
Ammonium sulphate	15,018	29,356
Ammonium nitrate	6,364	15,375
	Cwt.	Cwt.
Chloride of lime	24,318	32,101
Calcium carbide	4,856	3,496
	Gal.	Gal.
Benzol	5,644	11,742
Cresylic acid	198,886	266,209
Tar oil, creosote, anthracene oils, etc.	1,896,725	3,647,495
	Cwt.	Cwt.
Naphthalene	1,826	3,206
Nitro-cellulose	871	559
	Tons	Tons
Copper sulphate	823	1,918
	Cwt.	Cwt.
Disinfectants, insecticides, weed killers, etc.	59,212	59,918
	Tons	Tons
Manufactured fertilisers	4,003	2,771
	Cwt.	Cwt.
Glycerine	128	2,226
Lead acetate, litharge, etc.	5,279	5,778
Nickel salts	3,932	4,228
Potassium compounds	3,854	8,109
	Tons	Tons
Salt	14,338	16,292
	Cwt.	Cwt.
Sodium carbonate	194,348	197,051
Caustic soda	146,102	173,545
Chromate and bichromate	—	1,955
Sodium nitrate (synthetic)	386	984
Sodium silicate	12,590	14,924
Sodium sulphate	21,207	99,559
Cream of tartar	594	474
Tin oxide	376	1,400
	Tons	Tons
Zinc oxide	522	1,497
TOTAL VALUE OF CHEMICALS, EXCLUDING DRUGS AND DYESTUFFS	£ 2,871,219	£ 3,409,130
	oz.	oz.
Quinine and quinine salts	130,645	156,209
	lb.	lb.
Aspirin	118,755	179,885
	Mega units	Mega units
Penicillin	224,973	—
TOTAL VALUE OF CHEMICALS, DRUGS, DYES AND COLOURS	£ 5,409,659	£ 5,935,807
TOTAL VALUE OF MANUFACTURED OILS, FATS AND RESINS	715.456	642,738

CHEMICAL IMPORTS

	Nov., 1947	Nov., 1946
	Cwt.	Cwt.
Acetic acid	15,436	8,025
Boric acid	7,340	1,130
Other acids	2,022	3,224
Borax	26,460	3,000
Calcium carbide	2,161	8
Coal-tar products (excluding benzol and cresylic acid)	8,983	—
	Tons	Tons
Manufactured fertilisers	7,154	12,358
	Cwt.	Cwt.
Potassium chloride	518,530	388,340
Potassium nitrate	—	297
Potassium sulphate	26,184	11,774
Sodium nitrate	99,700	198
Sodium compounds	102.774	1,101
TOTAL VALUE OF CHEMICAL MANUFACTURES	£ 682,626	£ 305,993

Floating Factory

Sweden's 25,000-Ton Whaler

ANOTEWORTHY event in Sweden's shipbuilding industry was the recent delivery of the 25,000-ton whaling factory *Kosmos* III to the Norwegian whaling company A/S Kosmos, for whom it was built by the Gotaverken shipyard. The vessel will employ more than 400 men, and be capable of producing 450 tons of oil per day. Oil storage capacity is 1,125,000 cu. ft., and maximum speed 14 knots.

The ship was built at great speed owing to the necessity for having it ready for sea by December 8, the official opening of the whaling season.

Construction is such that a very large unobstructed flensing deck has been obtained amidships where the whale carcases are dissected following their entry through the stern slipway. Dissection is accomplished by means of modern electric machinery. The factory, which is situated on the 'tweendeck, measures 341 ft. by 78 ft. by 16 ft. in height, and would be accounted large even by shore standards.

Machinery, boilers, and other equipment are of the latest design, and include developments to permit the largest possible extraction rate. In addition to the production of whale oil, vitamins and certain other medicinal substances can be prepared in the raw state.

Special accommodation and laboratory facilities has been provided for chemists.

ESSENTIAL OILS FROM CEYLON

THE foundation stone of the new factories, offices and laboratories of the Eastern Chemical Industries, Ltd., was laid last week by Mr. C. Suntheralingam, Ceylon's Minister of Commerce and Trade, at Mattakkuliya, near Colombo. Mr. Rosslyn Koch, chairman of the company, said they were sure this enterprise would be welcomed not only by the Island's unemployed but also by the cinnamon growers. It is proposed to produce soap and essential oils. In these two products, said Mr. Koch, Ceylon would be not only self-sufficient but would perhaps also be able to compete successfully with foreign products.

The present minimum requirements of soap in Ceylon are about 10,000 tons a year, *i.e.*, about 3 lb. per head—a very low consumption compared with that of more developed countries. With regard to essential oils, the company proposes to start with the distillation of cinnamon bark oil for which Ceylon has ample indigenous supplies. To produce 1 lb. of cinnamon bark oil, foreign manufacturers have to import as much as 1 cwt. of chips.

Styrene Development

Large-Scale Plant Completed

IN a reference to the use of styrene in paint production, which his company had recently patented, Viscount Greenwood, chairman of Lewis Berger & Sons, Ltd., said last that these patents would reduce the foreign currency requirements for linseed oil, and make valuable use of products of British oil refineries.

Trial quantities of these styrene paints (Gergermaster), he said, have created an enviable reputation among users, and the completion of a large-scale plant has now allowed general marketing in this country. Viscount Greenwood said that leading manufacturers are arranging the manufacture of products by the use under licence of these styrene patents.

COAL: BEST SINCE 1940

FIGURES issued by the Ministry of Fuel and Power last week show that total coal production for the week ending December 29, 1947, was 4,400,600 tons. This marks a satisfactory culmination to 1947, the latter part of which was marked by successive weekly increases.

An interesting feature of the week's production was a drop from 4,183,700 tons to 4,165,700 tons of deep-mined coal—happily more than off-set by an increase in opencast from 180,800 to 234,900 tons.

Of the 6,156,100 tons still to be won to reach the 200 millions target, last week's production of 2,745,200 tons, necessarily small in view of the short week, leaves 3,410,900 tons outstanding.

New Tungsten-Nickle-Copper Alloy

The introduction of an alloy of tungsten, copper and nickel, to the General Electric Company's range of metallurgical products is announced by the metallurgical division of the company's chemical department. The alloy is said to possess a density 50 per cent greater than lead and is "applicable to the design and construction of moving parts possessing maximum inertia and minimum size." Originally developed in response to demands for a material of high density for use on a gamma ray screen, "Hevimet" is adaptable to the construction of balance weights for the elimination of vibration in crankshafts, modern air screws, centrifugal clutches and other rotating parts. Combining great tensile strength with good machinability, it is highly resistant to atmospheric salt water corrosion and easily plated with cadmium, chromium and nickel. It can be silver soldered and brazed by standard methods.

Progress Report on Germany

Continued Severe Shortage of Essential Chemicals

IN the latter part of 1945, with a shortage of food throughout Germany and very little fertiliser on hand, chemical fertilisers were given priority by the Allied Military Government as a means to obtain the greatest possible crop production in the summer of 1946. The problems encountered in attempting to renew full-scale production in the chemical plants were numerous; transport was inadequate, and deliveries of coal and coke were slow. As a result, only very small amount of fertiliser could be applied to the soil for the 1946 crops, and it was not until 1946 that a programme for maximum production actually started, under the terms of a quadripartite agreement providing for the production and distribution of fertiliser among the four occupation zones of Germany.

THE fluctuating prospects of Germany's heavy chemical industry need constantly to be re-assessed in the light of fresh international conclusions and conflicting counsels from other interested quarters. The principal conclusion of these notes by a Special Correspondent recently returned from the British and American zone is that stringent shortages of essentials will monopolise the full-time activity at least of the heavy chemical industry for a long time to come, and the re-entry of the German industry into the world chemical market is not appreciably nearer

At the same time, the Combined Food Board in Washington made available to the four zones large amounts of nitrogen and superphosphate fertilisers, together with the necessary phosphate rock to produce superphosphate in Germany. For the period from July 1, 1946, to June 30, 1947, about 70 per cent of the nitrogen requirements, 42 per cent of the superphosphate requirements, and 82 per cent of the potash requirements of the country were available. Although this programme will not meet all Germany's requirements for the next crop year, it represents a vast improvement upon the past two years, and it is expected that fertiliser requirements for 1947-48 will be completely filled.

Sulphuric acid is currently being produced in the U.S. zone at the rate of about 3000 tons a month, or about 25 per cent of the plant capacity to be left in Germany by 1949. It is being made entirely from iron pyrites, mined in Germany but in insufficient quantity to meet current needs. There is at present a world-wide shortage of soda ash, urgently needed for production of soap, glass, and other important products. The U.S. zone has only one plant producing soda ash at the present time, and this is operating at only 25 per cent of its projected 1949 capacity.

One of the most important products coming from the U.S. zone is calcium carbide, the direct or indirect source of the fertiliser calcium cyanamid, acetylene gas, vinyl resins, alcohol, vinegar, and numerous solvents. The lacquer, plastics, and pharmaceutical industries are also dependent to a large degree on the products of calcium carbide. At the present the plants in the U.S. zone are operating at about 90 per cent of their proposed 1949 capacity.

The once-great German dye industry is now operating at about 10 per cent of the allowed 1949 capacity in the U.S. zone, with production of dyestuffs largely limited to two colours, blue and black, used for dyeing American uniforms to be worn by DPs, PoW, and German guards. Chief limiting factor in this field has been the shortage of coal tar products; but the economic merger with the British zone, which possesses the necessary raw materials, brought a considerable increase in the volume of production.

Drugs for Export

The pharmaceutical industry was one of the first to recover after the war, and is already producing some items for export. There is still, however, an acute shortage of insulin and penicillin in Germany, and imports of both have been necessary to supply the minimum requirements. Efforts at producing insulin from fish glands are reported to have resulted in a high yield and aroused much interest. Plans are currently being made to produce penicillin in sufficient quantities to meet the country's requirements.

Soap production is insufficient to meet normal requirements, due to an extreme shortage of fats and oils. No relief is anticipated until normal imports of these items can be resumed; meanwhile, to forestall epidemics due to lack of soap, every effort is being made to collect used fats and to expand the production of synthetic detergents.

By order of the Control Council, chemicals of a strictly military nature, the production of which is forbidden, include: all high explosives except those required for peacetime uses, double base propellants, single base propellants except those for use in sporting weapons, nitroguanidine, rocket fuels, including hydrogen peroxide of above 37 per cent concentration, hydrazine hydrate, and methyl nitrate, highly toxic products from bacteriological or plant sources, except those for therapeutic purposes

Industrial Reparations Defended

Criticism of Policy in U.S.A.

AT a recent U.S. Press conference dealing with the subject of dismantling German plants, Acting Secretary of State, Robert Lovett, denied statements which have appeared in the Press alleging that the programme for dismantling German plants under the Revised Level of Industry Plan for the bizonal area conflicts with the objectives of the ERP (European Recovery Plan) and increases the cost of foreign aid to be borne by the U.S.A. It has been said that Germany could in the near future produce from these plants products which were urgently needed by other European countries and, in addition, that the dismantling programme diverted substantial amounts of German labour and materials from productive use. Furthermore, it is claimed that the Level of Industry Plan places a permanent and low ceiling over the future German standard of living and that severe unemployment will result.

Persistent Shortages

"These arguments are not supported by the facts," said Acting Secretary Lovett. "The basic purpose of the removal programme is to transfer as reparations to countries which suffered war damage excess productive capacity in Germany. The full use of all existing capacity in Germany is prevented by shortages of food, fuel and raw materials. These shortages are worldwide, and are likely to persist throughout the period of the European Recovery Programme.

"The only way by which Germany could use its total industrial capacity would be to grant her absolute priority over other European countries in the allocation of these scarce materials. Such action is, of course, completely undesirable, and it is expected that the utmost German effort will be required to attain even by 1951 the volume of output in the bizonal area envisaged by the Revised Level of Industry Plan.

"At the present time, capital removals are the only form in which Germany can make even partial reparation for the damage inflicted upon her victims. The contemplated removals in large part represent transfers of plants which were established in connection with the German war machine and which have been determined by the U.S. and U.K. authorities in Germany to be unnecessary for the German peacetime economy.

Denies Increased U.S. Cost

"Rather than serving as a drain upon the United States through increased financial assistance to other European countries, the removal programme will tend to have the opposite effect of lessening this burden.

"The Revised Level of Industry Plan does not permanently limit German production and the German standard of living. The capacity which is to be transferred under the removal programme would remain idle in Germany during the next few years if not removed and continue to deteriorate. Within whatever limits may finally be determined with regard to security against future aggression, Germany will be free to expand production, and thus there is no permanent productive ceiling to cause unemployment."

45 FELLOWSHIPS IN CHEMISTRY

THE E.I. Du Pont de Nemours Co. has just announced that it is awarding eighty-one post-graduate and post-doctoral fellowships to forty-seven universities throughout the U.S.A. for the 1948-49 academic year. Among six awards being offered for the first time are post-graduate fellowships in electrical engineering at the University of Illinois and the Massachusetts Institute of Technology, and one in metallurgy at Lehigh University. The three remaining new awards are post-graduate fellowships in chemistry assigned to Carnegie Institute of Technology, University of Delaware, and Washington University at St. Louis, Mo.

Each post-graduate fellowship provides $1200 for a single person or $1800 for a married person, as well as an award of $1000 to the university. Each post-doctoral fellowship provides $3000 for the recipient with a grant of $1500 to the university. The selection of candidates for the fellowship awards and the choice of problems on which they are to work are, as in the past, left to the universities. The individual is under no obligation as regards employment after he completes his work under the fellowship.

The annual awards are made to encourage young men and women to undertake advanced study in the fields of chemistry, physics, chemical, mechanical and electrical engineering, and metallurgy. "There is an ever-increasing demand in the chemical industry," a company statement declares, "for students with post-graduate training in these fields."

Aid to Chemistry

Forty-five of the 81 1948-49 awards are in chemistry, five in physics, fifteen in chemical engineering, seven in mechanical engineering, two in electrical engineering, one in metallurgy, plus six post-doctoral fellowships in chemistry.

Flames and Organic Sulphur Compounds

Valuable Data Provided by the Gas Industry

by L. T. MINCHIN, B.Sc., M.Inst.Gas.E.

MUCH of the matter discussed at the last research meeting of the Institution of Gas Engineers was of interest to chemists, especially to those concerned with that important chemical reaction between certain combustible gases and air which is fundamental to the gas industry. The simple bunsen flame still has its mysteries, and it was perhaps surprising to find how many relatively simple phenomena there are, the mechanism of which is still in dispute.

Two of the papers were digests of studies written during the war and immediate post-war period in foreign countries, particular attention being paid to the effect of turbulence on the rate of flame propagation in a mixture. The classical heat-conduction theory of Mallard and Le Chatelier still holds its ground remarkably well, and attempts to apply it in the case of the enhanced heat transfer associated with turbulent flow give results which are in reasonable agreement with theory.

Turbulent Flow

According to this theory, it will be recalled, the rate at which a flame travels through a mixture can be calculated from the rate at which the heat of the flame front is conducted back to the layer of gases behind it. Formerly nearly all measurements on flame speeds were made with the gases flowing smoothly out of long tubes at relatively low Reynolds' numbers, a condition which leads to a very thin inner cone, varying in thickness according to various authorities from 0.1 mm. to 1 mm. Once the Reynolds' number exceeds 2000 and turbulent flow sets in, however, the flame thickness increases, and there is evidence of a higher rate of flame propagation, reaching three to four times its normal value at Reynolds numbers of 20-30,000.

With this rise in velocity goes a rise in flame temperature, and it is more than possible that we may have been exploiting this fact for many years without knowing it. The plumber's blowlamp and many industrial gas burners are examples of turbulent flames which, it is now conjectured, may owe some of their efficiency to their turbulence.

Unknown Factors

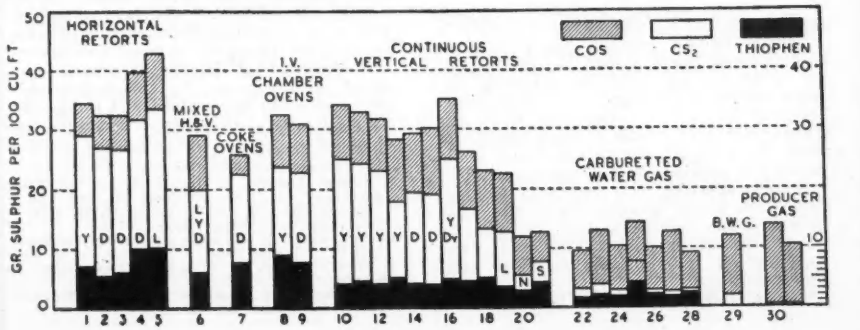
What effect does the presence of free radicals and other active species have on the behaviour and properties of a flame? The effect on the infra-red and visible spectrum is well known, but whether the rate of heat transfer to a solid is affected by them is still in dispute.

Kilham[2] has recently measured the rate at which heat is transferred to a refractory rod coated with various oxides from a carbon monoxide-air flame. So far, his results indicate that the flame may be regarded, so far as heat transfer goes, as behaving exactly as would an inert gas at the flame temperature. However, the experiments at Leeds University on which these conclusions are based have evidently not gone far enough yet: gases containing hydrogen have not yet been employed, and only the pure oxides of uranium, nickel, chromium and aluminium have been tried.

Organic Sulphur

In an entirely different field, the organic sulphur compounds present in town gas have been the subject of an exhaustive survey by the Gas Research Board, and a full report has now been issued.[3] The gas from forty separate streams in fourteen different gasworks has been examined, and the accompanying Fig. provides a summary of all

(*Continued overleaf*)



Heat Transfer in Jacketed Vessels

A PAPER, of which the following is an abstract, tracing recent investigation of heat transfer in agitated jacketed cast iron vessels, was read at the last meeting of the North-Western Branch of the Institution of Chemical Engineers at Manchester, by Messrs. R. W. Brown, R. Scott, and C. Toyne.

The data were obtained during manufacturing operations in large-scale vessels agitated by anchor and by propeller agitators driven at 40 and 120 r.p.m. respectively; they were 5 ft. internal diameter and had hemispherical bottoms. The sulphonators and nitrators had walls 1¾ in. and 1¼ in. thick respectively. The sulphonation vessels were serviced for steam and water, and the nitration vessels for water; the annular spaces of the jackets were 1¼ in. and 1 in. respectively.

Data for the heat transfer on the sulphonators were taken during the cooling of the batch and on the nitrator during a period of constant temperature when the heat of reaction balanced the heat removed by the cooling water. Batch temperatures were taken at intervals during the cooling of the batch and the heat removed from the batch was calculated from the rise in temperature of the amounts of cooling water measured during those intervals.

The experiments were extended to include the cooling and heating of batches of water. The overall heat transfer coefficients were based on the inner wetted surface area of the vessels; they varied between 20 and 25 for sulphonations, 70 and 90 for agitated water and were 17 for nitrations at 40°C., the units being C.H.U./sq. ft.-hr. °C.

The variation of the cooling water film coefficient with differing rates of flow was calculated from the experiments on cooling and on heating of charges of water in the pans. The conductance of the wall of the vessel was calculated. The film coefficients for the batch mass at different temperatures were obtained from the above and from the overall coefficients. The equation of Chilton, Drew and Jebens was successfully used to correlate the batch film coefficient with the viscosities of the batch at various temperatures.

The authors then considered measures by which an increase in the heat transmission of these vessels might be improved; the only promising measures consisted of putting in a cooling coil and the more difficult one of providing baffles in the jacket.

FLAMES AND ORGANIC SULPHUR COMPOUNDS—*(Continued from Page 9)*

the results obtained in terms of carbon oxysulphide, carbon disulphide and thiophene.

The presence of both COS and thiophene is unfortunate, since present techniques do not permit them both to be taken by any one process. The thiophene is removable by oil washing, but resistant to catalytic hydrogenation: the oxysulphide is easily converted by catalysis but almost unaffected by oil washing. (All concentrations are given in grams of sulphur per 100 cu. ft.: to convert to parts per million w/v multiply by .023.)

Oil Cracking

During the past year the exigencies of the coal situation have caused the cracking of oil to become an important gasworks process.[4] Some oil cracking there has always been, of course, in carburetted water gas plants, but last winter's crisis called for much more gas production than could possibly be provided by the existing methods.

Broadly speaking, two emergency methods have been used; spraying oil on the coke in the water gas generators during the "run" or steam part of the cycle, and spraying oil into suitably modified horizontal retorts.

The former process has been used in America, and because of the opportunities it provides for very quick conversion in an emergency, has been adopted at Newcastle recently. The up-run water gas can be greatly enriched in this way, as much as 14 per cent unsaturated hydrocarbons being obtained; during the down-run, however, the oil vapour has to pass through the whole fuel bed and it is cracked to H_2 and carbon.

The alternative method pioneered in this country by the Gas Light & Coke Co. is the spraying of oil together with steam and, in some cases, air into a horizontal retort maintained at a lower temperature than that employed for coal carbonisation—namely, 500°-700°C. An iron trough or wide pipe is provided inside the retort to prevent the liquid oil coming into contact with the retort walls and to provide additional surface area. By this means quite good yields can be obtained, but the gas has a high density and the proportion which can be added to district gas is limited.

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"Recent Studies of Aerated Burner Plants": G. W. Culshaw and J. E. Garside (Comm. No. 325).
2 "Third Arthur Duckham Research Fellowship Report, 1946-47": J. K. Kilham.
3 "Town Gas": J. W. Wood and others (Comm. No GRB33).
4 "8th Report of Chairman's Technical Committee, 1946-47": (Comm. No. 321).

River Polution Offences

Inadvertant Discharge of Cyanide

CHARGED with "causing a liquid matter to flow into waters containing fish to such an extent as to cause the said waters to be poisonous or injurious to fish," Thomas Catterall, factory manager, at Caernarvon County Magistrates' Court pleaded not guilty (THE CHEMICAL AGE, December 6). A similar charge was preferred against Hunting Aviation, Ltd., Luton Airport, Luton.

It was stated at the original hearing that Catterall was employed as an inspector at the Peblig Mills, situated on the River Seiont. A part of the premises contained fifteen metal tanks, nine of which were used for cleansing purposes and contained pure water. One of the remaining tanks contained a solution of cadmium and its capacity was about 200 gallons. At the material time it was estimated the tank contained 180 gallons of solution and that 45 lb. of potassium cyanide were dissolved in it. Owing to a leak the tank containing the poison was emptied into one of the others.

Fish Died

On October 28 defendant inspected the plant. On examining the tank containing the poison he took it to be dirty water. He had not been informed of the change. He turned on the water tap and, finding that it was not clearing, he opened a second tap and the liquid ran out through the normal filters into the river without being treated. Later a quantity of dead fish were taken out of the river, together with a sample of water.

At a subsequent hearing, the Bench heard the case against Hunting Aviation, Ltd. It was submitted that the company was not responsible for what the defendant did. He had exceeded the scope of his duties. The Bench found the case proved.

Catterall was fined £1 and ordered to pay £14 4s. 3d. costs. The general manager of the company said the firm would pay the fine and costs for Catterall. Hunting Aviation, Ltd., were fined £20 and ordered to pay £14 4s. 3d. costs.

Fatal Rocket Explosion.—It would probably not be possible, because of damage, to ascertain the exact cause of the explosion, said the coroner at the inquest at Aylesbury this week at which verdicts of accidental death were returned on two scientists and a technician killed when an experimental rocket motor exploded at the Rocket Experimental Station at Westcott, Bucks, on November 14. The jury added a rider that the authorities should consider employing an indirect method of observing experiments.

More Synthetic Resins

Additional Welsh Factory in Operation

PRODUCTION is being started in a new factory at Pontyclun, near Cardiff, by the Permutit Co., Ltd., of new synthetic resins which were originally developed by the Department of Scientific and Industrial Research in 1935. During recent years considerable research work has been carried out in the Permutit Research Laboratories, and important improvements made. These materials are of importance to industry in general because of their special properties. They can be used for the production of distilled water without the necessity for application of heat, for the concentration of dilute chemical solutions for the recovery of traces of precious materials present in large volumes of water, which would not be economic to recover by evaporation, and for the purification of many chemical solutions to improve yield and quality of product. Equally, these materials can be used for water treatment for the production of soft and non-corrosive water for any requirement.

Chemical Uses

One of the valuable properties of these resins is to enable a process water to be prepared of any required composition, irrespective of the composition of the crude water. In chemical factories, power stations, etc., these resins can serve as fuel savers, not only from the point of view of the prevention of scale and corrosion of boilers, but also by virtue of their properties as concentrators of chemical solutions and removers of dissolved salts without the necessity for distillation.

As examples of chemical processes to which the synthetic resins can be applied outside the field of water treatment the following are cited: 1, Purification of sugar solutions from dissolved mineral salts; 2, Recovery of copper from cuprammonium waste liquors; 3, Isolation of alkaloids such as nicotina; 4, catalysis of chemical reactions; 5, Recovery of traces of precious metals from dilute trade wastes.

STREPTOMYCIN CONTROLLED

THE distribution of streptomycin in Eire has been entrusted to the Medical Research Council, and arrangements in connection with its supply have been approved by the Eire Minister of Health and the wholesale section of the Irish Drug Association.

It is understood that only in exceptional circumstances will the supply be authorised for the treatment of patients who are not in a hospital having suitable facilities for the administration of streptomycin. Supplies will be used to combat sulphonamide- and penicillin-resistant bacteria.

CHEMICAL PRODUCTS OF COAL CARBONISATION—II

Possible Yields of Acetylene and Ethylene

by JOHN R. CAMPBELL, B.Sc., Ph.D., A.R.T.C., F.R.I.C.

ALTHOUGH at present it may not be advisable to remove methane, either completely or in part, from coal gas, it is necessary to consider its potentialities in view of the possibility of the present work on methane synthesis being developed by the gas industry.

Two methods of synthesising methane from coal or its by-products are available. Either the coal may be hydrogenated catalytically under pressure, in which case no olefins would be expected to persist in the resulting gas and no ethylene would therefore be available; or water gas may be used as a source of synthesis gas. It is possible that one or other of these two methods might be exploited as a source of methane for gas enrichment purposes, as a source of standby gas, or compressed or liquefied for use in internal combustion engines and also as a raw material for the chemical industry.

Essential Need

Although methane is the least reactive of all the aliphatic hydrocarbons, it is possible to convert it into useful products in several ways. Thermal decomposition at high temperatures, with or without the aid of catalysts in regenerative furnaces or in an electric arc, can be controlled to produce mainly hydrogen, acetylene or ethylene Of these products, the most attractive in this country would undoubtedly be acetylene, the chemical development of which presents such enormous possibilities and the manufacture of which cannot be long delayed if this country is to retain its position in the forefront of the chemical industry.

Production of acetylene is suitably accomplished by exposing methane to high temperatures for a very short time, generally in the electric arc. For example, with a gas feed containing 90 per cent CH_4, 2 per cent C_2H_6 and 8 per cent N_2 passage through an iron arc produces a gas containing about 17 per cent C_2H_2, 4 per cent C_2H_4, 50 per cent H_2 and some 25 per cent of undecomposed methane, together with an appreciable amount of carbon black. The gases can be separated by fractionation at low temperatures.

Pure methane is not essential for the production of acetylene by this method, in fact the presence of higher paraffins increases the reaction velocity very considerably, presumably by the production of free radicals which then attack the methane. It would therefore be a comparatively simple matter to separate a methane-rich fraction from coal gas which would provide a suitable starting material for acetylene synthesis of this type.

Ethylene formation is favoured by the use of lower temperatures in the thermal cracking method, while the use of catalysts tends, in general, to increase the decomposition of methane into carbon and hydrogen.

Alternative Methods

Mild oxidation of methane at relatively low temperatures (below 500°C.) in a deficiency of air gives rise to methyl alcohol and formaldehyde (the latter product being an important intermediate in the manufacture of phenol-formaldehyde and urea-formaldehyde resins) while catalytic oxidation in presence of an insufficiency of oxygen leads to the formation of a mixture of carbon monoxide and hydrogen:

$$2CH_4 + O_2 \rightarrow 2CO + 4H_2$$

in the ratio suitable for use in the Fischer-Tropsch synthesis. This reaction is being utilised in America for the manufacture of synthesis gas to be used in turn for the production of oxygenated compounds by the Fischer-Tropsch method.

Controlled combustion of pure methane in pure oxygen has been used in the production of acetylene. The hydrocarbon, preheated to about 650°C. is burned in oxygen and the products of combustion quench-cooled by means of water sprays. With a methane-oxygen ratio of 2 : 1 temperatures of 1500°C. are reached and the time of contact of gases with the combustion zone is reduced to the order of 0.01 second. Under these conditions the resulting gas contains 8-9 per cent C_2H_2, 3-4 per cent CO_2, 6-7 per cent CH_4, 24-26 per cent CO and 55-56 per cent H_2. The acetylene is concentrated by washing the gases with water.

Oxidation of methane by means of steam also furnishes a mixture of carbon monoxide and hydrogen

$$CH_4 + H_2O \rightarrow CO + 3H_2$$

which can be utilised either as a basis for synthesis gas or the carbon monoxide can be converted to carbon dioxide and hydrogen by treatment with more steam

$$CH_4 + 2H_2O \rightarrow CO_2 + 4H_2$$

to furnish ultimately hydrogen for hydrogenation reactions.

Part 1 appeared on pp 820-22, Vol LVII.

Nitration of methane by means of nitric acid in the vapour phase at temperatures in the region of 500°C. and with short periods in the reaction zone yields nitromethane, a liquid which boils at 101°C. and is of interest as an explosive component, a solvent, an oxidising agent and a very reactive agent in the manufacture of many other chemicals.

Chlorination of methane, in which the four hydrogen atoms are successively replaced by chlorine atoms to give four chlorinated derivatives, is a vigorous exothermic reaction which takes place with explosive violence unless the temperature is kept below 450°C. and daylight is excluded. This necessitates the use of means to provide for the rapid dissipation of the heat generated during the reaction and usually the dilution of the reactants with an inert gas or by the addition of a considerable excess of one of the reactants. Of the four derivatives possible :—

Methyl chloride	CH_3Cl	B.P. 24°C.
Methylene chloride	CH_2Cl_2	44°
Chloroform	$CHCl_3$	61°
Carbon tetrachloride	CCl_4	77°

the last three are important as solvents but there appears to be very little methylene chloride manufactured in this country at present and none of the three is prepared directly from methane, although the chlorination of methane has been practised for some time on the Continent and in the U.S.A. Methyl chloride finds application as a refrigerant.

Source of Carbon Black

In common with the other lower members of the paraffin series, methane can be used in the preparation of carbon black either by direct cracking to its elements or by incomplete combustion. Carbon black is used principally as a filler for natural and synthetic rubbers and in the paint and printing ink industries. The annual output of carbon black in the U.S.A. alone in 1946 was over 1244 million lb., prepared from natural gas and liquid hydrocarbons; this represents an increase of 18 per cent over the 1945 output. Meanwhile, the rubber industry in the United Kingdom is greatly handicaped by the lack of an adequate supply of carbon black of the right quality.

Another reaction which methane undergoes and which might warrant further study from the point of view of commercial exploitation is its conversion to prussic acid, hydrocyanic acid, used in the plastics industry in the manufacture of acrylonitrile. Prussic acid may be prepared from methane in several ways. It is formed by the interaction of ammonia and methane at high temperatures and with short exposure times :—

$$NH_3 + CH_4 \rightarrow HCN + 3H_2.$$

Alternatively, air may be added to the ammonia-methane mixture and the mixed gases passed over platinum gauze at 1000°C. when the following reaction takes place :—

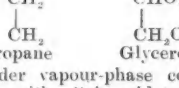
$$2NH_3 + 2CH_4 + 3O_2 \rightarrow 2HCN + 6H_2O.$$

Small quantities of hydrogen cyanide are also formed when a mixture of methane and nitrogen are passed through a high frequency arc :—

$$CH_4 + N_2 \rightarrow HCN + NH_3,$$

but at present the yields by this method have not been encouraging.

By controlled oxidation, ethane and other paraffins can be converted ultimately through ethylene to acetylene and its derivatives. The relationship of ethane to DDT (which will be considered later) and of propane to synthetic glycol and the glyptal resins is of interest :—



Propane Glycerol

Under vapour-phase conditions, propane reacts with nitric acid to give a mixture of nitropropanes which are becoming of increasing importance as solvents and chemical intermediates simplifying the syntheses of complicated organic compounds. Furthermore, the increased reactivity of ethane and propane over methane suggests that these compounds could serve as intermediates for the production of other important organic products containing two and three carbon atoms in the molecule.

Ethylene

The reactivity of the olefins suggests that ethylene will become one of the two basic materials of the future organic chemical industry, the other being acetylene. An enormous amount of work, both theoretical and practical, has been carried out on ethylene and the ground is well prepared for the development of an industry based on this hydrocarbon.

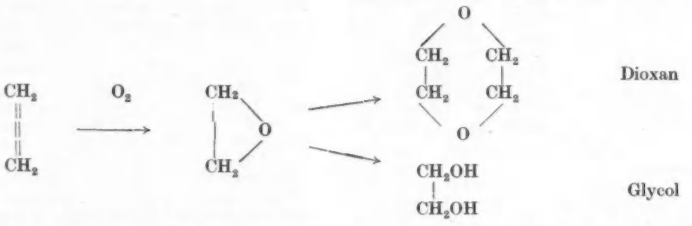
Ethylene is available from two major sources. Gases from oil refining processes contain up to 7 per cent of the hydrocarbon and coal gas contains up to 2½ per cent by volume. By fractionation of refinery gases an ethylene-rich gas containing methane and ethane may easily be obtained and the ethylene can be separated from this mixture by chemical reaction with sulphuric, phosphoric or hypochlorous acid.

At the moment, oil refining is not carried out to any notable extent in this country so that virtually the only source of ethylene available in Britain is coal gas. Judging by Continental practice, there is no difficulty in extracting ethylene from coal gas and its purification from associated paraffin hydrocarbons is a relatively simple matter.

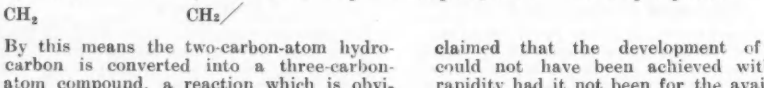
In organic synthesis, ethylene is an important starting material on account of the

fact that it contains a double bond, which confers on it a definite reactivity, and also because it contains two carbon atoms. Most of the recent developments in the plastics, rubber and allied industries have been founded on very simple molecules and in this respect ethylene, with its great reactivity, occupies almost a unique position.

By controlled oxidation ethylene can be made to yield ethylene oxide and then either the well-known water-miscible solvent dioxan, or ethylene glycol, largely used as an anti-freeze agent :—



By making use of the "Oxo" process (treatment with hydrogen and carbon monoxide under pressure and in the presence of catalysts) developed in Germany during the past decade, ethylene can be converted into propionic aldehyde and thence to propionic acid :—



By this means the two-carbon-atom hydrocarbon is converted into a three-carbon-atom compound, a reaction which is obviously of importance in chemical synthesis.

However, it is without doubt in its application to the manufacture of plastics and synthetic rubber that ethylene finds its greatest application. In presence of a trace of oxygen at about 200°C. and under a pressure of about 2000 atmospheres, ethylene polymerises to give polyethylene or, as it is more usually called, polythene or alkathene. Polythene is a translucent waxy material built up of methylene groups arranged in long chains thus :—

$$—CH_2—CH_2—CH_2— \ldots —CH_2—CH_2—CH_2—$$

by the head to tail junction of a large number of molecules of ethylene. The experimental work leading to the production of polythene was carried out in 1934 and commercial production was realised soon after. During the war considerable expansion of production occurred both in this country and in America when the material was found to have extensive use in high frequency electrical apparatus. It has been claimed that the development of radar could not have been achieved with such rapidity had it not been for the availability of this material. Its desirable properties suggest that it will have many peace-time uses and will therefore be greatly in demand.

(To be continued)

LARGE FRENCH SULPHUR RESERVES

IT is not surprising, in view of its importance in the national economy, that the question of sulphur supplies recurs frequently in the French technical Press. Among the latest is a study of the sulphur deposits in the Bassin de Manosque (Basses Alpes)—also noted for its lignites. Geologically it is a lacustrian formation of the Miocene age with alternations of sandstone, limestones and schistous clays with gypsum. It contains several deposits of lignite, and at the base of these latter, on the left bank of the Largue, are numerous sulphur veins, which have already been worked to a small extent by two concessionaires since 1882 with some interruptions. (*L'Ind. Chim.*, 1947 (October), *34*, 194.)

The sulphur is presumed to have been deposited more or less uniformly from the lake waters, and in this formation there are seven layers with intermediate layers of other earth or mineral, and the total thickness of the sulphur averages just over three metres out of a total thickness including other earths of some 40. m. Actual sulphur content ranges from 10-30 per cent.

From calculations and workings so far made it is estimated that there are some 4 million tons of sulphur ore, corresponding to about 800,000 tons pure sulphur, almost wholly in the St. Martin de Renecas concession—with possibilities of still larger supplies.

Ceylon's Reviving Cinchona Industry

by S. N. GANGLY, Ph.D. (Lond.)

PRIOR to the outbreak of war, 93 per cent of the world's supply of quinine used to be derived directly or indirectly from the Dutch East Indies. In view of the wide prevalence of malaria in the eastern tropics, so much dependence on one particular source for so essential a drug appeared unsatisfactory. Steps began to be taken, therefore, to make the vast territories owing allegiance to the British Crown, self-sufficient.

Java was the first of the Eastern countries where cinchona found a new home after its transfer from its original home on the eastern slope of the Andes. In the seventies of the last century, cultivation of cinchona assumed large proportions in Ceylon. This country had by then become a serious rival to the cinchona industry in Java. In fact, by the last quarter of the 19th century Ceylon attained pride of place as the biggest cinchona growing country in the world. The area planted jumped from 15,000 acres in 1875 to 64,000 acres in 1883. Comparative figures of production in the other principal cinchona growing countries in the East in 1880 are as follows:—

Country	Acreage under cinchona	Bark processed per year in lbs.	Yield per acre per year
1. Java ...	7500	480,000	64
2. India			
(a) Bengal	4200	550,000	130
(b) Madras	5800	400,000	69
3. Ceylon ...	33500	1,000,000	30

The cinchona grown there was generally of the poor yielding variety known as *Cinchoan Succirubra*, intermixed in some cases with the *Cinchona Robusta* and *Cinchona Officinalis*, also low yielding. While the Ceylon planters grew coffee in the salubrious climate of the Ceylon hills, and made no effort to further improvements on their methods of cultivation of cinchona, the Dutch, with their usual thoroughness, continued systematic research with a view to further improvements.

Supplanted by Tea

By 1880 over-production had set in and the price of bark fell from 72 Dutch cents, that year, to 7½ cents ten years later. The first consignment of *Cinchona Ledgeriana* bark from Java with a high quinine content made its appearance in the market in 1873 and a rapid change in the situation ensued.

At the time there was no factory in Ceylon to process its bark for conversion to quinine and hence, there being no local demand, the Ceylon bark was faced with competition against the superior *Ledgeriana* bark from Java. The result was inevitable and the Ceylon cinchona industry met a deserved doom. The area under cultivation shrank to 5000 acres by 1893 and cinchona was gradually and steadily replaced by tea, a new arrival in the field.

In India, the position was very much the same, except that the plantations were not so extensive as in Ceylon, and there were Government-owned factories to consume the bark produced at the Government plantations. The private plantations, which had neither Government backing nor any suitable outlet for their bark were wiped out of existence while those Government owned, just managed to maintain a struggling existence.

Neglected Plantations

Recent surveys revealed that isolated patches of cinchona still continue to grow in Ceylon almost wild and uncared for, in the tea estates, and also in the Crown forests and patanas. As the war clouds appeared on the horizon, fresh attempts began to be made to utilise whatever bark was available locally. Steps also were taken to cultivate under State management on modern scientific lines.

It generally takes about seven to eight years for cinchona to bear economically. In the meantime, a factory was established by the Government in 1942 to process all locally available bark, which was estimated to be 120,000 lb. per year. In practice, however, this amount could not be secured during the war years partly due to labour shortage. The project was embarked on, not so much with motives of profit, as of meeting the country's requirements of a drug of great importance for its national well being.

Ledgeriana bark of Indian variety generally contains an average of 4 to 5 per cent quinine whereas that derived from Java averaged nearly 10 per cent. Any bark containing much less than 5 per cent quinine was normally considered useless from the manufacturer's point of view. The local bark obtained from the remnants of the old plantations was found to yield an average of 1.5 per cent quinine and an equivalent amount of other alkaloids grouped together under the trade name of cinchona febrifuge.

This latter drug consists of cinchonine, cinchonidine quinidine and certain amorphous alkaloids together with about 5 to 7 per cent unextracted quinine. Though somewhat crude in nature, it is quite an effective anti-malarial and finds application in the making of certain pharmaceuticals and other proprietary drugs.

(*Continued overleaf*)

NATURAL INSECTICIDES

N.E.I. Prepares for Renewed Production and Use

OWING to the big expansion since the war of the use of DDT and other chemical weapons against insects, weeds, etc., the Government of the Netherlands Indies is trying to rehabilitate the natural derris root and pyrethrum flower on the market.

The cultivation of derris was much encouraged in Peru by the U.S.A. during the war. Its entire output was taken by the American Army, and the same appears to have been the case with other South American derris productions. The common use of it was, however, restricted in U.S.A. and free sales were forbidden.

More Synthetics

Much attention was turned to the special class of "repellents" against mosquitoes, flies, etc., made in the U.S.A. whereby anthelmintica are being applied by a well-known Baltimore firm. As to the class of synthetic insecticides DDT, hexachlorcyclohexan and hexachlorethyltetraphosphate, it was found that the latter, which in America is made by the Woodstock process, is pretty constant, but that it hydrolyses easily in contact with water and is poisonous, although not in the same degree as nicotine. When hydrolysed, the virulence is much less, while the after-effect does not equal that of arsenic-containing insecticides.

The official report states that two chemists of the Insecticide Division, Department of Agriculture, Washington, have been successful in their endeavour to synthesise the natural pyrethrines. So synthetic pyrethrum is likely to appear on the markets in due course. The synthesis of chrysanthemum monocarbon acid is already an established fact, while the synthesis of cinerolon and pyrethrolon is nearly so. But the cost factor is still in doubt. American traders are still ready to buy the natural product freely because the virulence to human life of natural rotenon in derris is believed to be negligible.

Other natural insecticides of Netherlands Indies are: anthelmintica carpaine (from papaja leaf) and laboemerah, the essential oil from Melaleuca bracteata and other "baits" made from the dried fly Epicanta neficeps which is common in those parts. Speciments of the specialities have been sent to American traders for introduction on the market.

High Prices

Americans are asking for more citronella oil because high prices are asked by Guatemala and Haiti where its cultivation has been encouraged under the influence of war-time scarcity. The Netherlands Indies authorities are aware that the market price of essence of cloves and aniseed oil is too high, in the light of the strengthened competition of the synthetic products. But in their opinion rubber pit oil, although at a disadvantage regarding colour and acid grade (which, however, may be improved by refining), has a ready chance as a drying oil in the paint industry, while the scarcity of linseed oil continues. The latter circumstance makes also for the ready saleability of chia oil from Salvia Hispanica at prices which are very near those paid for linseed oil.

REVIVING CINCHONA INDUSTRY

(*Continued from page 15*)

With regard to prospects of local cultivation of cinchona, it is difficult to foretell anything with certainty. From a survey of soil and other conditions, it appears that suitable land is not wanting in Ceylon. Although the volcanic Java soil is to a great extent superior to the Ceylon soil, the latter is by no means inferior to the type of soil and other conditions prevalent in cinchona growing areas in India or many other parts of the world. Ceylon cannot claim outstanding success in the past but the present procedure is radically different.

It is imperative that, in order to achieve success, only the high yielding *Ledgeriana* or this grafted on to *Succirbura* should be cultivated in preference to the low yielding but the sturdier *Succirbura* and other varieties. Great difficulties were experienced at the outset in securing *ledgeriana* seeds. It was impossible to import them from Java, owing partly to war conditions and more so because there were jealously guarded by the Java planters. Ultimately, the Government of India stretched its helping hands and the requisite amount of seeds was obtained from India, thus making the initiation of the scheme possible. It is too early yet to pronounce judgment on this new enterprise, but it shows promise of success.

It may be recalled in passing, that although the medicinal use of cinchona bark was realised in Europe in 1640, the isolation of quinine from the bark was effected only in 1820 by the French chemists Pellelier and Caventou. The method of manufacture of quinine adopted now in Ceylon is very much the same in principle as that adopted in India and the West.

Ceylon's requirements of quinine averaged 27,000 lb. per year in pre-war days. With the advent of efficient insecticides like pyrethrum and DDT, this figure may soon be considerably reduced.

Metallurgical Section

Published the first Saturday in the month

Metallurgical Section

3 January 1948

Progress in Welding Technique

New Method with Composite Plates

A NEW and unusual type of welder for the manufacture of composite or clad plates used in pressure vessels and a new variation of the slabbing process for bonded composite plates have been described by Mr. O. R. Carpenter, engineer of the Babcock & Wilcox Company, New York.

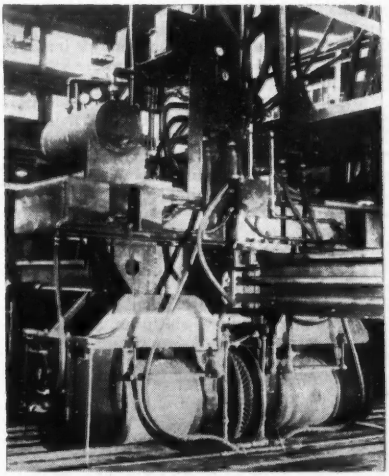
Of a type not formerly used for steam welding applications, the new welder has the merit of providing a more consistent welding voltage, considerable power saving, and higher current flow into the work for shorter periods. It helps to overcome the problems of shunt currents and contact resistance. In the new mechanism two rotary type transformers are used, in contrast to the conventional transformer which is stationary, and a pulsating current to the weld is obtained by means of a pulsation timer.

Mr. Carpenter outlined recently to the American Society of Mechanical Engineers two successful methods in general use to-day in the manufacture of composite plates. In the slabbing method the stainless cladding material and the steel base plate are assembled into a sandwich with the stainless material protected on its bond side by plating with either nickel or iron. The heat and pressure of the subsequent rolling operation forms the bond. In the resistance welding method a number of alloy sheets are attached to a steel plate by means of either spot welds or overlapping spot welds, commonly called seam welding.

In seam welding, the form of resistance welding used by Babcock & Wilcox, the clad layer is usually made up of three layers consisting of two of the alloy material and one of pure nickel. The nickel helps to prevent carbon migration and increase the total area bonded to the steel. Nickel will bond to steel at a relatively low temperature and it has been shown that along the edges of the fused area of the resistance weld, a region of nickel is full bonded to the steel and alloy.

Power Economy

In designing the new machine it was evident that considerable power and voltage would be needed for short periods of time. An integral type of transformer places the rolls directly within the secondary current carrying members of the transformer and therefore gets to the work its full output with a minimum loss. It becomes possible to reduce the overall KVA demand by approximately one-half and the efficiency and latitude of application becomes measurably greater.



The new welding installation shows remarkable compactness of design

The primaries of the two rotary-type transformers used in the design are connected in parallel; the secondaries, which consist of a single turn about the primary, are connected in series relationship. The primary core is circular wound and is designed for operation at 80,000 lines per sq. in. The high voltage winding is supported around the core. It consists of pancake coils of four turns each of square copper tubing. Each coil is series connected so that the primary consists of 144 turns.

Water cooling is used for the primary. The two transformers are mounted by means of a main bearing and individual vertical slides. Pressure to the welding rolls is transmitted through this mounting by means of the pressure cylinders. The centres of

(*Continued overleaf*)

Congo Mineral Resources

Big Reserves of Copper and Tin

THE Union Minière du Haut-Katanga, one of the world's largest producers of copper, mined 1,567,000 tons of ore in 1946, yielding 145,300 tons copper. Figures for 1945 were 2,305,000 and 194,400. Known ore reserves are said to be capable of giving 7,500,000 tons of copper. Total yields since 1906 have been 3,068,000 tons.

Tin output from the same source during the war was about 1500 tons per annum, and there are said still to be 20,000 tons of cassiterite in the Busanga mine. Production, however, ceased in 1946, but may be resumed later. Small quantities of gold and silver are also mined. The gold mine at Ruwe, which stopped working in 1940, is said to contain appreciable reserves. At Shinkolobwe some uranium and auro-platiniferous ores are now being worked.

An associate company of the Union Minière, the Sogechim (Soc. Gen. Indust. et Chim. du Katanga) manufactures various chemicals, including up to 45,000 tons of sulphuric acid annually from zinc sulphide of the mines, using a platinum catalyst for the contact process. Other products include fatty acids and glycerine, by hydrolysis of vegetable oils, of which about 3000 tons are used annually for the purpose; sodium chlorate (for explosives) and caustic soda, from electrolysis of brine; potable water by ozone treatment; small quantities of zinc and copper sulphates, and reagents used in ore flotation.

New Light Alloys

Better Than Duralumin ?

THREE interesting new alloys are reported from Italy. They have been evolved at the Experimental Institute of Light Metals there and, although they are based on aluminium, their characteristics are said to be superior to those of duralumin. Their tension resistance is given as 60, 65 and 70 kilogrammes per sq. millimetre, while that of duralumin does not exceed 45 kg. Their extensibility reaches 10-15 per cent and their hardness (Brinell) 170-180 kg. per sq. millimetre. Their weight is 2.8 grammes per c.c. They can be worked in a variety of ways and can replace some steels. The composition of the new alloys is still a secret but it is known that it comprises titanium, chromium and manganese. Their special characteristics are due to a special complicated heating process

Hot Rolling of Aluminium Alloys

In the hot rolling of aluminium alloys (Al-Mg-Si) at 450°C. from cast sheet billets surface crackings often occur, and sheets produced from such billets by cold rolling are unfit for deep drawing. Reporting some tests in this connection (*Hutnicke listy*, June 1947, 77-80) K. Holes found that it was necessary to heat the sheet billets intended for hot rolling to 540°C. in order to avoid cracks during hot rolling, and to obtain facility in deep drawing of the sheets produced at an annealing temperature of 400°C.

PROGRESS IN WELDING TECHNIQUE—(*Continued from page 17*).

the welding rolls may be adjusted by means of screws and cross slides. A variable-speed drive moves the entire carriage along the cross beam at a fixed rate during welding.

The resistance characteristics of the new welder are extremely low because of close coupling of power source to the work. This gives a more consistent welding voltage. To overcome the stresses built up in the equipment and which result in a variable condition between start and finish of a welded seam when the welding rolls travel a comparatively long distance, a reverse pressure is applied between successive welds.

Tension tests on the Croloy bonded plate produced with the equipment show an average of 24,000 per sq. in. in shear, and tension tests show failure at the line of fusion of the fillet weld on an average of 30,000 per sq. in. While the Croloy bonded liner method with reference to the bonded area is not within the ASME requirements of an "integrally" clad plate, since some area is inbonded, it is of interest to note, Mr. Carpenter pointed out, that the mechanical property requirements of the integral type of plate are closely approached by this applied liner process.

Variant of Slabbing Process

A new variation of the slabbing process has also been developed recently by the same company, Mr. Carpenter stated. The method is believed to be applicable to most alloys and non-ferrous materials. Thermit powder is ignited over a preheated alloy plate, this reaction causing pure iron to be deposited slowly through a flux on to the surface. In travelling through the flux the thermit metal is cleaned or washed of slag and its temperature is so regulated that fusion of the iron to the alloy occurs evenly over the entire face. A subsequent rolling operation of an assembled sandwich then welds a steel slab to the iron surfaces which have been fused by the thermit method to the alloy plate.

High Temperature X-Ray Studies

New Apparatus Traces Crystalline Modifications

AN important application of X-ray diffraction is the identification of crystalline forms of substances, providing, in addition to information about chemical composition, data on the particular crystalline modification present. Since modifications are not constant or stable and many crystalline substances exhibit structural changes on heating, the need for suitable apparatus is evident.

To fulfil this need—that is, to enable investigation of modifications which exist at high temperatures, as well as the rates of inversion and crystal formation—a high temperature powder X-ray diffraction apparatus by means of which patterns may be obtained while materials are at elevated temperatures has been developed by H. F. McMurdie and A. Van Valkenburg, of the Microscopic and Diffraction Analysis Laboratory at the United States National Bureau of Standards.

Hitherto all the high temperature X-ray diffraction devices developed have used photographic film which must be kept cool to record the pattern, with the result that their application has been limited to temperatures of approximatey 1000°C., or less. In the apparatus developed by McMurdie and Van Valkenburg, a Norelco X-ray spectrometer is used in which a Geiger counter replaces the photographic film and it is possible to obtain patterns with specimens maintained at temperatures up to 1500°C. As the Geiger counter is moved by a small synchronous motor through the Bragg angle, 45° to 5°, in 40 minutes, the diffraction pattern is recorded on a strip chart.

A resistance furnace of special design replaces the specimen holder of the spectrometer and consists of a brass base with a ceramic insert to which is attached a platinum specimen holder for the powdered sample. This is mounted in the heating element, consisting of two ceramic tubes fit-

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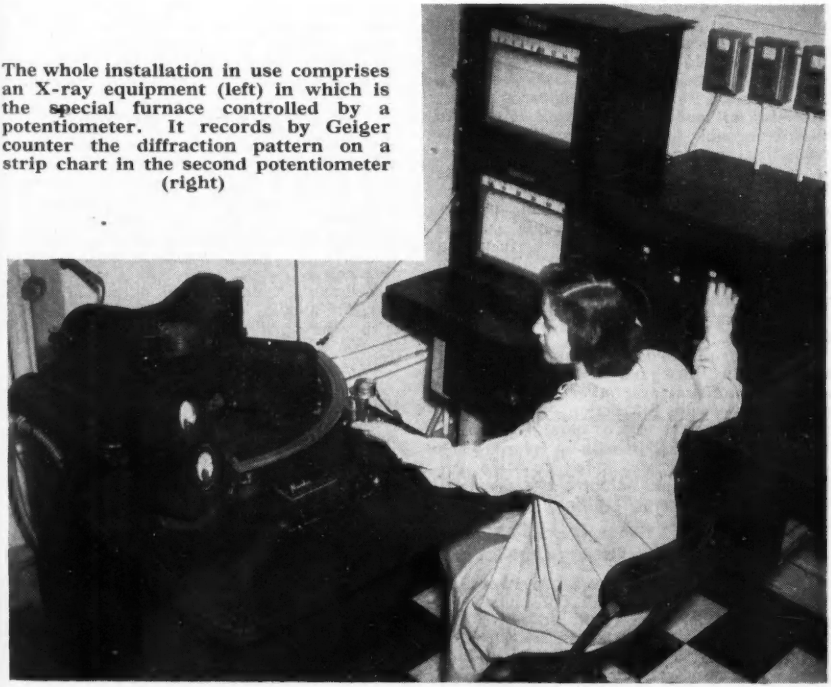


The whole installation in use comprises an X-ray equipment (left) in which is the special furnace controlled by a potentiometer. It records by Geiger counter the diffraction pattern on a strip chart in the second potentiometer (right)

one inside the other with a platinum winding on each tube. Surrounding the heating element coaxially is a platinum radiation shield and a stainless steel shield enclosed in a brass cover. To reduce the heat conveyed to adjacent parts, water cooling coils are provided for the cover and the brass base. Openings in all elements surrounding the specimen holder allow passage of the X-ray beam. The openings in the outer brass jacket are covered with thin sheets of beryllium to prevent cooling draughts and to keep radiated heat from the adjoining parts of the equipment. Beryllium was chosen for this use because of its high transmission of X-rays.

The temperature of the furnace is regulated and measured by the upper recording potentiometer operating from a thermocouple whose junction is placed just above and in front of the specimen.

Immediate Evidence

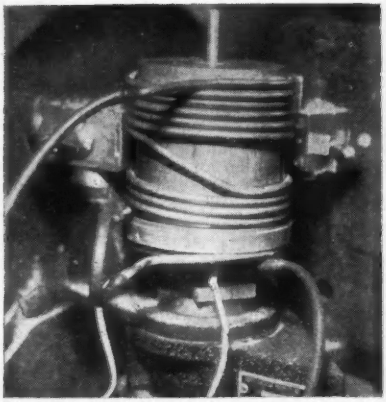
With this equipment it is possible to obtain a pattern of a sample at a specified temperature. Since the pattern is produced immediately in a usable form, and no photographic processing is required, the crystalline state of the material is readily identified. The temperature can then be adjusted to a different value and a new pattern made in a matter of minutes.

In many cases it is not necessary to run the complete 45° of the pattern, since the information needed can be obtained in a few degrees. For example, in studying the inversion of monoclinic zirconia (ZrO_2) to the tetragonal form, a crystalline transformation accompanied by volume changes, it is necessary only to study the peaks between 12° and 18°. Abrupt volume changes may introduce undesirable properties in products containing zirconia, such as high-temperature refractories including spark-plug insulators. X-ray diffraction patterns obtained in the 12 to 18° region by the new apparatus readily identify the crystalline forms of zirconia and the inversion temperature.

The X-ray diffraction apparatus utilising the specially designed furnace possesses several advantages over other high-temperature X-ray powder diffraction cameras. Any number of patterns can be obtained at temperatures up to 1500°C. without intermediate cooling of the sample under investigation. In addition, only 40 minutes are required for producing a complete diffraction pattern in a form ready for study.

Many Uses

The apparatus also offers a new approach to problems arising from differences in atomic, molecular, and crystalline structure of many materials. Further investigation is now under way to determine changes in the crystal phases of refractory bodies occuring in use at temperatures up to about 1500°C. Other applications include studies of thermal expansion of powdered materials and of additions that will affect the rate of inversion of titania from the common form of anatase to the more useful rutile. Of particular importance in the ceramics industry, data may now be obtained directly on the crystalline changes taking place in raw materials during manufacturing processes.



The water cooling coil surrounding the furnace reduces the heat conveyed to adjacent parts

WORLD STEEL FIGURES

STEEL production in Luxembourg is reported to have totalled 1,302,258 metric tons in the first ten months of last year, and that of cast-iron 1,473,980 tons. The increased price which had to be paid for German coke, and French and Swedish ores is likely to have caused increased production costs.

Belgium's October steel output of about 280,000 metric tons compares favourably with the pre-war monthly average of 259,000 tons.

It is hoped to maintain this higher level.

In Japan, steel ingot production by electric furnaces totalled in August 50,453 metric tons. About 5,800 metric tons of special steel were also produced.

Reports from the Soviet Union indicate that some steel plants are lagging behind in the achievement of target figures, and the Government has called for greater efforts in the New Year.

Another Plant for Du Pont.—E. I. Du Pont de Nemours and Co., of Wilmington, has purchased for $350 million the Government plant at New Castle, Delaware, which will be used to supplement the Chamers Works plant at Deepwater, N.J., for the manufacture of chemicals.

Spherical Metal Formations

Wide Application of French Patent

AN improved method of obtaining spherical lead shot, with a minimum of tear-shaped particles, is claimed by Soc. Minière et Métallurgique de Pennaraya, 12 Place Vendôme, Paris, in Eng. Pat. Application No. 4422/1947 (Conv. date, March 12, 1946). The process may be applicable in other departments of powder metallurgy. In the usual method of forming lead shot by allowing molten lead to fall a considerable height from a container with perforated bottom many of the particles become tear-shaped and have to be re-melted, especially if the lead is not pure Addition of arsenic which has been proposed as remedy is in many ways objectionable.

In the present invention, the molten lead during its fall comes into contact with a reducing or inert medium (inert in the case of metals free from oxygen), whereby the particles are rendered practically 100 per cent spherical, even with impure lead. The reducing medium may be liquid or gaseous, *e.g.*, hydrocarbons such as butane; or, if inert, nitrogen or carbon dioxide. The method is applicable also to zinc, cadmium, bismuth, tin, and alloys. The action of the reducing or inert medium is said to be its prevention of formation of oxide layer, which otherwise reduces surface tension of drops and causes them to form tear-shaped particles.

Apparatus is also claimed for carrying the method into effect. If a reducing gas is used it is of advantage to provide a hydraulic joint and maintain slight pressure to prevent entrance of air. Suitable means for removal of particles are claimed and illustrated according as a gaseous or liquid reducing or inert medium is employed.

PORCELAIN ENAMEL TESTS

A NEW testing apparatus for measuring the adhesion of porcelain enamel to base metal by means of magnetic counting has recently been developed by the Research Foundation of the Porcelain Enamel Institute in the National Bureau of Standards, Pittsburgh. It was primarily designed to supplement the conventional fracture test for adhesion and provide more complete data on the impact characteristics of porcelain enamels. The tester unit is assembled in one piece, consisting of a test head, stand and specimen holder mounted on the control cabinet, which contains the power supply selector switch, and magnetic counter. The test head is moulded plastic and contains 169 spring-actuated steel probes, individually connected to respective segments of the selector switch. The mass of probe is similar in appearance to the face of a fine wire brush.

D

U.S. Bauxite

Home Production Down—Imports Up

PRODUCTION figures for domestic bauxite in the U.S.A., which have just been issued by the U.S. Bureau of Mines, show that the third quarter of 1947 witnessed a continuance of the downward trend indicated by the previous quarter. Total U.S. production amounted to 285,978 long tons, of which 269,853 tons came from Arkansas, the remainder originating from Alabama, Georgia, and Virginia.

By contrast, imports of bauxite amounted to 509,577 long tons, 3 per cent more than in the previous quarter, and representing a new record. Chief sources of supply were Surinam (Dutch Guiana) 468,022 tons, and Netherlands Indies 38,855 tons.

TITANIUM METALS FOR AIRCRAFT

ACCORDING to "Investigation of National Resources" (Vol. I) just published by a U.S. Government committee set up to report on U.S. mineral resources, a pilot plant of the Bureau of Mines is producing sheets of titanium metal for use in aeroplane construction. Reference is also made to 39 other minerals including coal, petroleum, tungsten, manganese, bauxite, copper, lead, and zinc.

Other volumes subsequently to be issued by the committee will deal with such subjects as chemical and electrochemical products, fuels and wood and wood products.

Italian Mercury Output.—Italy produced 950 tons of mercury in the first half of 1947, against 1130 in the corresponding period of 1938. Mercury ore production totalled 80,000 tons in the same period, compared with 102,000 tons before the war. Of the 950 tons produced, 400 tons were shipped to the U.S.A., 200 tons to France, 150 tons to India and Ceylon, 60 tons to Switzerland, and 10 tons each to Britain, Canada and Hong-Kong.

American Chemical Notebook

From Our New York Correspondent

RECENT figures on foreign trade indicate that the dollar shortage in many foreign countries is beginning to have an effect on exports from the U.S.A., according to the Alexander Hamilton Institute Inc., New York. This should not be too startling a revelation since it is what economists and internationally-minded industrialists and businessmen have been predicting since the onset of dollar shortages abroad. After reaching a record high level last spring, the general tendency has been for U.S. exports to decline. Because of the large disparity which developed between purchases by foreign countries in the U.S.A. and their sales to this country, many of the nations of Europe and the Western Hemisphere had found it necessary to tighten up import controls. With the world virtually divided into sterling and dollar trading areas it had become increasingly necessary for nations within the two separate spheres to intensify trading activities and confine themselves to their own spheres.

* * *

If Congress should adopt substantially the long-range European recovery programme, this, says the Alexander Hamilton Institute, would tend to modify the decline in exports from the U.S. During the first three quarters of 1947, the deficit of the countries in the " Marshall Plan " area in their trade with the U.S. was equivalent to a rate of approximately $4,500 millions a year. This is about equal to the amount which the Administration had tentatively recommended to be granted annually during the next four years to the sixteen Western European countries (and Western Germany) coming under the Marshall Plan. On the basis of present indications, however, the prospect is that the full amount of aid requested by the Administration will not be sufficient to stem the tide of declining exports. There would still remain an estimated trade deficit among other countries approximately equal to that of the " Marshall Plan " nations. It is true that some of these countries still have substantial gold and dollar balances, and that some will be able to obtain credits from the World Bank and the International Monetary Fund, as well as from the Export-Import Bank.

* * *

Dr. Linus C. Pauling, who at 46 is chairman of the division of chemistry and chemical engineering of the California Institute of Technology, and one of the world's leading theoretical chemists, has been elected president of the American Chemical Society for 1949. Dr. Pauling has won many high honours both at home and abroad for his contributions to basic chemical science, and took office as president-elect of the Society on January 1, when Dr. Charles A. Thomas became president. Dr. Thomas, who is executive vice-president and technical director of the Monsanto Chemical Company, St. Louis, Missouri, succeeds Dr. W. Albert Noyes, Jr., of the University of Rochester. Dr. Pauling, who this year received the Davy Medal of the Royal Society of London, was chosen for the presidency by the American Chemical Society's Council from four nominees receiving the largest number of votes in a national mail ballot of the society's 55,000 members.

* * *

The Du Pont Company has just placed on the market a new fungicide, called " Parzate," which contains 65 per cent zinc ethylene bis dithiocarbamate, 15.4 per cent of which is expressed as metallic zinc, and which is said not only to control many diseases, but can be mixed with DDT and other insecticides. The new material was formulated for the convenience of growers who are looking for a single weapon to use against diseases of numerous vegetables, fruits and flowers. " Parzate " was successfully used during the 1947 growing season against late blight of potatoes and tomatoes. It is recommended for the control of leaf blight diseases of celery; downy mildew and other leaf diseases of the cucumber and related plants; rust and anthracnose of beans; downy mildews of spinach and beets; and azalea petal blight, snapdragon rust, and camelia blight. It also has natural adhesive properties and under ordinary circumstances does not require sticking or wetting agents. Used as a dust, it mixes with talc, pyrophyllite, or other non-alkaline diluents. It is compatible with such insecticides as DDT, rotenone, pyrethrum, nicotine, and the arsenicals, and with other fungicides except those derived from copper.

* * *

A polystyrene plastic lens, which is said to increase substantially the photometric efficiency of (U.S.) General Electric's new photographic exposure meter, is one of four different plastic materials incorporated in the new product. The lens, moulded by the G-E Plastics Division, improves distribution of light on the surface of the photo-cell and thereby increases its response to the light flux from a given solid angle. Other plastic parts include a scale plate window of methyl methacrylate, a black phenolic case for the meter, and a laminated regulator. The case is made of cotton-flock phenolic compound developed by the company's plastics division for the U.S. Navy during the war.

Technical Publications

ALTHOUGH examination and comparison of materials by electronic means is not new to industry, there is as yet no extensive use of the technique applicable to general industrial use. This has been largely due to the fact that instruments have been designed and made to fulfil specific purposes, a condition that has dictated comparatively high costs of production and installation. More recently, however, science has been able to produce electronic comparators capable of application to a wider variety of industrial requirements for analysis and examination of texture or molecular structure. One such instrument is the Cornelius electronic comparator, the applications and use of which is the subject of a 20-page booklet published by A. C. Wickman, Ltd., Coventry.

* * *

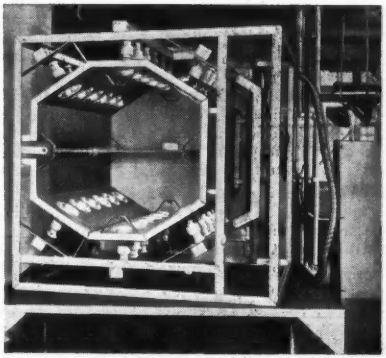
Chemical manufacturers and metallurgists, among the largest users of water-cooling appliances, will find much useful information in "Visco Water Cooling," publication No. 471 of the Visco Engineering Co., Ltd., Croydon, Surrey. It contains useful, fundamental information on the potentialities and behaviour of such plants, together with tables and meteorological data of an international character.

* * *

Wintry conditions can be relied upon to present industry with a number of problems in connection with transport—both within and without the factory. One such difficulty is the icing-up of road surfaces, a condition for which chemical science can offer various remedies. Layers up to ½ in. of ice or compacted snow are effectively dealt with by sodium chloride either alone or mixed with sand or ashes. Calcium chloride and magnesium chloride may also be used. Calcium chloride although more expensive, may prove more effective for use in the lower temperatures to be found in northern regions. Interesting information and advice on this subject are provided by "Road Note No. 2, Chemical Treatment for Icy Roads," a recently revised wartime publication of the Road Research Laboratory of the British Road Federation, Ltd.

* * *

The eleventh edition of the Classified Directory, 1947, of the Association of Consulting Chemists and Chemical Engineers, Inc., of New York, is now being distributed (free), giving source of reference, name of person and that of his company, complete address including postal zone number. The amended and enlarged edition runs to 120 pp. and is conveniently sectionalised.



One of the most recent applications of infra-red heat principle, this equipment, fitted with reflector-type lamps, is part of the permanent demonstration of infra-red industrial plants presented by the Metropolitan-Vickers Electrical Co. at 132-5 Long Acre, London, W.C.2

* * *

A valuable addition to the literature of chemical research is "The Chemistry of Organic Cyanogen Compounds," the latest monograph (No. 105) to be published by the American Chemical Society. The author, Dr. Vartkes Migrdichian, has explored many aspects of these compounds, and has conveniently marshalled and documented his findings. Copies may be obtained from Reinhold Publishing Co., 330 West 42nd Street, N.Y.18 ($12).

Toxicity of Plutonium

Plutonium, the violently radioactive element of which atomic bombs are made, can be swallowed in small amounts with virtually no ill effects, it was disclosed last week in a paper which Mr. Wright H. Langham of the health division of the Los Alamos Scientific Laboratories, New Mexico, presented at a technical conference sponsored by the Chicago Section of the American Chemical Society. He said that recent laboratory tests indicate plutonium is extremely poorly absorbed from the intestinal tract, which means that only slight exposure can occur to workers who may, in the course of their work, swallow small amounts of it. Even when substances like sodium citrate, which increases the solubility of plutonium, were added to the solutions administered orally, rats used in the study absorbed only about 0.2 per cent of the total amount swallowed.

Home News Items

U.K. Copper Output.—Production of copper products and metal in the U.K. during November totalled 46,980 tons, consumption of virgin copper being 324,079 tons, and copper alloy scrap 14,901 tons.

Rayon Production.—Rayon production during the month of November amounted to 18,300,000 lb. This was a reduction on the October figure, but a considerable increase on the November, 1946 total of 14,900,00 lb.

Welding Research Papers. — Intending applicants for the £100 B.O.C. Welding Prize are reminded that papers must be submitted to the British Welding Research Association on or before September 30, 1948.

Steel Production.—Steel production during the first half of December, 1947, was at the average rate of 14,300,000 tons per year, says a British Iron and Steel Federation announcement. This is the highest figure ever recorded for the first half of December.

Scots' Five-Day Holiday.—Scottish chemical plants are generally enjoying a five-day break at New Year, although conditions may vary from plant to plant. Since New Year's day fell on a Thursday the general break extends from Wednesday night until Monday or Tuesday morning.

Dearer Steel. — Discussions have been taking place between representatives of the steel industry, Board of Trade, and Ministry of Supply on the question of raising the price of steel consequent upon the recent increase in the price of coal. Five shillings is regarded as a likely increase per ton of steel.

Anglo-Swedish Trade. — It has been officially announced that next year Britain will export to Sweden coal, iron, steel, chemicals, textiles and other commodities to the value of about £50 millions. In return, Sweden will send timber, wood pulp, iron ore, and other raw materials and manufactured goods of equivalent value.

£50,000 Gift to Commemorate Penicillin.—A gift by Lord Nuffield of £50,000 to Lincoln College, Oxford, to found three research fellowships in science and medicine is to commemorate the discovery of the chemotherapeutic properties of penicillin in the Sir William Dunn School of Pathology, of which the head is Sir Howard Florey, a fellow of Lincoln College.

Research Station Appointments.—In a statement after a meeting of the East Kilbride Development Corporation in Glasgow last month, Sir Patrick Dollan, chairman, said that staffing arrangements were being made for the various departments of the proposed mechanical research station at East Kilbride and Thorntonhall. It has been agreed to advertise for major appointments.

Next Week's Events

MONDAY, JANUARY 5

Society of Chemical Industry (London Section). Rooms of the Chemical Society, Burlington House, Piccadilly, W.1, 6.30 p.m. H. J. Bunker: "Some Scientific Aspects of Beer."

TUESDAY, JANUARY 6

Royal Institution. 21, Albemarle Street, W.1, 3 p.m. Prof. E. K. Rideal: "Chemical Reactions: How They Work." (For juvenile audiences.)

Institute of Welding. Reynolds Hall, Manchester College of Technology, 7 p.m. S. W. Carpenter: "Automatic Welding."

THURSDAY, JANUARY 8

Society of Chemical Industry, Chemical Society and Royal Institute of Chemistry (Manchester Sections). Chemistry Lecture Theatre, University, Manchester, 6.30 p.m. M. P. Applebey: "Crystallisation of Fertilisers."

Chemical Society. Burlington House, Piccadilly, W.1, 7.30 p.m. T. P. Hilditch: "Structural Relationships in the Natural Unsaturated Higher Fatty Acids."

FRIDAY, JANUARY 9

Oil and Colour Chemists' Association. Engineers' Club, Manchester, 2 p.m. F. Armitage and J. J. Sleightholme: "Further Developments in Styrene Copolymers."

Plastics Institute. Engineers' Club, Manchester, 6.45 p.m. J. M. J. Estevey: "Contact Resins."

Engineers' Debt to Chemistry

Speaking on "Lubricants and Lubrication" to the Scottish branch of the Institute of Petroleum in Edinburgh, Mr. E. A. Evans, president of the Motor Industry Research Association, admitted that it would have been difficult for certain phases of engineering to have developed to the present point, without the help of chemical additives. The development and application of these additives for lubricating oils was a remarkable story of the operation of force of circumstances, vision and application. Future development would be greatly influenced by their availability. The future purpose of additives would be to enable the engine designer to get more power out of the engine without increasing its size, a matter of vital importance.

Obituary

DR. PETER LEUZINGER, a director of the Ciba A.G., Basle, was killed with his wife in a motor accident near Oron, Switzerland.

MR. JOHN MURRAY MARTIN, a member of the firm of Hugh Martin & Sons, Coatbridge, ironmasters, until its acquisition by Bairds & Scottish Steels, Ltd., and a director of the Coatbridge Gas Co., has died, aged 70.

ALEXANDER LINDSAY, who was for over 30 years associated with William Beardmore & Co., Ltd., Parkhead Steel Works, has died at Glasgow, aged 54. He served his engineering apprenticeship with Murray & Paterson, Ltd., Coatbridge, and joined Beardmores when he was twenty. Later he became foundry manager, and subsequently a special director.

PERSONAL

MAJOR VICTOR LEFEBURE, West Heath Road, N.W.1, chemical warfare expert, left £50,943.

MR. H. G. LAZELL has been appointed a director of Eno Proprietories, Ltd.

MR. W. B. BAXTER has been appointed to the board of the United Steel Companies.

Mr. V. St. John Killery, whose appointment as a director of Imperial Chemical Industries Ltd., was announced last week

MR. H. C. WOODCOCK has retired from the board of British Benzol & Coal Distillation, Ltd.

MR. C. H. BURTON, a non-executive director of B. Laporte, Ltd., has been appointed vice-chairman of the company. MR. P. D. O'BRIEN, sales manager, has been appointed an additional director.

MR. GEOFFREY C. R. ELEY, deputy chairman of British Drug Houses, Ltd., has been invited to serve as a part-time member of the London Area Board being set up in connection with the transfer of control of municipal and other electricity undertakings in accordance with the recent Act.

DR. K. BAILEY, of the Biochemical Laboratory, Cambridge, has been appointed to the Alan Johnston, Lawrence and Moseley Research Fellowship of the Royal Society.

MR. H. COUSINS, publicity manager of the British Aluminium Co., Ltd., will retire at the end of January, after completing 40 years' service with the company. The publicity department will be combined with the present sales research and statistical section under MR. C. G. MCAULIFFE, as manager. The new department will be known as Publicity and Sales Research Department and will commence operation on January 1. MR. E. G. FIELDING will be responsible for the publicity work of the department.

MR. E. H. O. ELKINGTON has been appointed a director of Anglo-Iranian Oil Co., Ltd., in succession to MR. R. I. WATSON, who has resigned.

MR. JAMES FINDLATER, who, as recently announced, is retiring from the chairmanship of Price's (Bromborough), Ltd., has received a dressing case and tankard from the trade unionists of the Soap, Candle, and Edible Fats Trade Joint Industrial Council, of which he was a founder, in recognition of his services and the goodwill he has helped to create in the industry for more than a quarter of a century. His successor at Price's is MR. W. F. DARKE, a member of the Unilever organisation.

Productivity Committee

The Lord President of the Council, Mr. Herbert Morrison, has appointed Sir Henry Tizard to be chairman of the Industrial Productivity Committee. Members appointed include: Sir Edward Appleton (Secretary, D.S.I.R.), and Sir William Stanier (Scientific Adviser, Ministry of Supply). Provision has also been made for the appointment of one or more employers to be chosen in consultation with the Federation of British Industries and the British Employers' Confederation.

War Service Award

Recognition of the services of MR. R. KINGAN in co-ordinating chemical defence research work between Britain and America has been made by the presentation of the Medal of Freedom, with Bronze Palms, by Major General Alden Waitts, Chief of the Chemical Corps for the United States Army. The citation reads: " Mr. R. Kingan, British civilian, as representative of the British Central Scentific Office in Washington from 1942 to October 1945, was a key figure in the exchange of chemical warfare information between American and British agencies.

Dr. John R. Bowman, who has been appointed head of the newly established Department of Research in Physical Chemistry, American Mellon Institute

Overseas News Items

U.S. Chemical Exports. — The United States exported in the first half of this year chemicals worth $387 million.

U.K. Coal for Portugal.—3000 tons of coal arrived at Lisbon last week from Sunderland. It was the second such shipment since the ban on coal exports from Britain was lifted.

Anglo-Iranian in China.—The Anglo-Iranian Oil Co., Ltd., announces the formation of a subsidiary company to distribute its products in China.

Iron Ore in Madras.—Large deposits of iron ore—estimated at about 600 million tons—discovered in Madras Province, have given rise to the possibility of developing an iron and steel industry there.

N.E.I. Refinery Reconstructed. — The Royal Dutch-Shell refinery at Balik-Papan is expected to recommence production towards the end of this year. This plant was an important producer of paraffin wax.

Antimony Deal.—Britain has agreed to take most of Bolivia's antimony output for the first half of 1948, thus beating the U.S. to that source of supply. *The Wall Street Journal* predicts that the U.S. will have only half of 1948 requirements.

More Soviet Uranium?—New uranium mines of high yield are reported to have been opened by the Soviet authorities in Saxony. The claim is made in the American-licensed paper, *Der Abend,* reported from its correspondent in Dresden.

U.S. Steel Scrap Shortage.—Owing to a shortage of iron and steel scrap in the U.S.A., the Department of Commerce has sent an eight-man mission to Germany to seek supplies. The mission's activities will be confined to the U.S. zone.

Austrian Iron Ore.—Production of iron ore in Austria is reported to be averaging about 90,000 tons per month compared with the former peak level of 150,000 tons a month. The number of workers totals 3200 and 1.4 million kWh are utilised monthly.

India's Industrial Plans.—The Indian Industries' Conference, which held a four-day meeting at New Delhi last week, adopted a key resolution for a three-year labour-capital truce in industry "during which there will be no lock-outs, strikes, or 'go-slow' practices."

Viruses Photographed.—Photographs of disease viruses attacking living cells secured with the aid of the electron microscope have been shown to the Electron Microscope Society of America at Philadelphia. Some of the photographs represent up to 300,000 magnification.

Russian Petroleum.—Petroleum output in the southern and western regions of the Soviet Union in 1947 is claimed to have exceeded last year's by 69 per cent.

Ambergris Find.—Ten tons of ambergris found at sea by the Brazilian ship *Araxa* last month were said to be worth £350,000. The proceeds are being shared by the crew.

U.S.S.R. Completes Pipe-Line.—A new 125-mile pipe-line has recently been completed in the Ural region of the Soviet Union. It connects the Tiumaza oil fields in the so-called second Baku with the Ufa refineries.

Higher U.S. Chemical Prices.—It is reported from the U.S. that the price of several basic chemicals, including sodium chlorate, oxalic acid, coal tar and creosote are to be increased.

Malayan Tin Exports.—Exports of tin from the Malayan Union in November, 1947, totalled 4350 tons, of which the U.S. took 3800 tons, British Possessions 340 tons, and the European Continent 210 tons.

U.S. Potash Plant.—A new plant to be built at Carlsbad, New Mexico, for the International Minerals and Chemical Corpn., will manufacture muriate of potash and potassium sulphate.

Anti-Trust Laws Eased.—The U.S. Senate has passed an anti-inflation Bill which provides for partial suspension of anti-trust laws, and thus permitting industrialists to enter into voluntary agreements to prevent soaring prices.

Dunlop's African Plant.—A £500,000 expansion scheme will make Dunlop's Durban factory the largest making tyres in South Africa, and the biggest Dunlop concern outside Europe and U.S.A. Of a total cost of about £500,000 half will be for plant.

Skoda Works Progress Report.—The Skoda Works, one of the leading European armaments and machinery producers, has increased the output from its armature shops fourfold in the course of 1947. The prototype shop, which was destroyed during air raids towards the end of the war, is scheduled to move to a new plant early this year.

Nauru Island Phosphates.—The Pacific Ocean island of Nauru, which contains phosphate rock deposits estimated at 90 million tons, is to be jointly administered by Britain, Australia, and New Zealand. It was formerly a British Commonwealth Mandate under the League of Nations, and occupied by the Japanese from 1942-45. The present decision was reached at a recent meeting of the general assembly of the United Nations.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

FAIRBANK KIRBY (WHOLESALE), LTD., Grimsby, chemical dealers. (M., 3/1/48.) November 25, £5000 debentures; general charge. *Nil. August 7, 1947.

DAMANCY & CO., LTD., Harrow, mfg. chemists. (M., 3/1/48.) December 2, charge, to Westminster Bank, Ltd., securing all moneys due or to become due to the Bank; charged on 41 High Street, Harrow. *Nil. October 6, 1947.

GRANVILLE WOOD & CO., LTD., Oldham, mfg. chemists. (M., 3/1/48). December 2, £3300 mortgage, to F. S. Clarke, Lymm; charged on land with warehouse, offices, &c., Ascroft Street, Oldham. *£3300. October 10, 1947.

PETROCARBON, LTD., London, E.C., dealers in oils &c. (M., 3/1/48.) August 20, £900,000 4 per cent registered "A" notes and £900,000 4 per cent registered "B" notes (subject to &c.) secured by Trust Deeds both dated July 31, 1947; general charges. *Nil. June 6, 1947.

BRITISH ALUMINIUM CO., LTD., London, E.C. (M., 3/1/48). November 15, disposition by Walter Geo. Street with consent, granted in implement of a Trust Deed dated July 30, 1947; charged on piece of ground part of lands of Craigs, Grangemouth (formerly Polmont), together with house &c. thereon. *£3,135,559. April 11, 1947.

PETROCHEMICALS, LTD., London, E.C. (M., 3/1/48.) August 20, two deeds by way of collateral security to Trust Deeds dated July 31, 1947, respectively securing £900,000 4 per cent registered "A" notes and £900,000 4 per cent registered "B" notes (subject to &c.), of Petrocarbon, Ltd.; general charges. *——. December 31, 1946.

MACROME, LTD., Wolverhampton, metallurgists. (M., 3/1/48.) November 18, first debenture, to Industrial & Commercial Finance Corporation, Ltd., securing £47,500 together with a premium of £2 per cent in certain events; charged on factory premises and further factory premises at Tettenhall, Wolverhampton, and dwelling houses, Olney, Middlefield Lane, West Hagley, and 39 Goldthorn Crescent, Wolverhampton. *Nil. July 30, 1947.

Company News

The nominal capital of **Soam, Ltd.**, soap manufacturers, etc., 30 Budge Row, London, E.C.4, has been increased beyond the registered capital of £100 by £49,900 in 1s. shares.

Sulphide Corporation announces a trading profit of £63,546 compared with £56,251 in the previous year. A dividend of 6 per cent is recommended on the preference shares.

New Companies Registered

John Anthony & Co., Ltd. (25,947).—Private company. Capital £100. Consulting analytical, manufacturing and general chemists, etc. Directors: J. Skinner and J. J. Skinner. Reg. office: 12 Barnton Street, Stirling.

Humblet Laboratories, Ltd. (446,574).—Private company. Capital £5000. Manufacturers of drugs, pharmaceutical products, medicines, chemicals, etc. Solicitors: Herbert Smith & Co., 62 London Wall, E.C.2.

Richsoil Production, Ltd. (446,586).—Private company. Capital £10,000. Manufacturers and merchants of chemical and other fertilisers and manures and seed and soil dressings, etc. Director: E. H. Ellis. Reg. office. Dacre House, Victoria Street, S.W.1.

Protocon, Ltd. (446,548).—Public company. Capital £10,000. To acquire and turn to account the benefit of certain secret processes relating to the production of protein and albumen from fish developed by L. M. Hirchberg. Directors: L. M. Hirchberg, F. Suessmann, P. H. H. Jones and F. N. Varney. Reg. office: 65 Broad Street Avenue, E.C.2.

Agro Chemical Co., Ltd. (446,501).—Private company. Capital £25,000. Manufacturers of chemicals and insecticides for agriculture, or chemicals used in industry or manufacture, etc., preparation and preservation of foodstuffs, agricultural and haulage machinery and equipment, agricultural fertilisers, etc. A. Monteith is a permanent director. Reg. office: 32 Ely Place, E.C.1.

Chemical and Allied Stocks and Shares

STOCK markets closed 1947 cheerfully, largely because of the big volume of reinvestment resulting from selling home rails with a view to exchanging into securities offering yields above the small return on gilt-edged stocks. Moreover, the good coal and steel production figures helped sentiment, and there has been another widespread rise

in industrial shares. Issue terms of the £1,000,000,000 of British Transport stock into which home rails are being exchanged have been eagerly awaited; they are bound to have a dominating influence for some time, not only on gilt-edged stocks, but also on markets generally. Owing to the large loss of income involved by the exchange into British Transport stock, many old holders of home rails are continuing to switch into industrial and other shares giving a reasonable yield.

Chemical shares reflected the upward trend in industrials, Imperial Chemical changing hands around 53s. 3d., Fisons active around 70s. 6d., and Monsanto Chemical 5s. ordinary up to 66s. 3d. at one time. Turner & Newall were good at 88s. 6d. awaiting the full results and chairman's annual statement. The units of the Distillers Co. have been firm at 31s. 9d. B. Laporte were 87s. 6d., and W. J. Bush 87s. British Glues & Chemicals 4s. ordinary at 23s. 9d. reflected hopes of an increase in the interim dividend. British Aluminium (52s. 4½d.) showed firmness on higher dividend talk, Borax Consolidated deferred were 55s. 7½d. and British Oxygen 103s. 1½d. Dunlop Rubber have strengthened to 79s. 3d., while United Molasses were 56s. 6d. Associated Cement at 75s. were prominent and British Plaster Board at 27s. 7½d. showed further improvement. Pinchin Johnson changed hands around 63s. 9d. and partly on talk that the £1 shares may be "split" into four of 5s. each, International Paint rose to £7⅜.

The iron and steel section was prominent on the steel production figures and expectations of an increase in steel prices early in 1948 which is said to be inevitable following the higher price of coal. Dorman Long at 30s. were at their highest level in 1947 and various other iron and steel shares closed the year not far short of their best levels for the past twelve months. United Steel were 28s. 4½d., John Summers 33s. 3d., Colvilles 30s. 1½d. and T. W. Ward 61s. 3d., with Guest Keen 48s. 9d. and Ruston & Hornsby 67s. 9d. Babcock & Wilcox 76s., have been firm, while Stewarts & Lloyds were 58s. 10½d., and Tube Investments £7½. The prospect of increasing coal exports in 1948 drew attention to Lambert Bros., which rose to 91s., and W. Cory were 106s.

Among textiles, Courtaulds have firmed up to 45s. 6d., with British Celanese 24s. 10½d., Bleachers 12s. 6d., Calico Printers 23s. 4½d., and Bradford Dyers 24s. 4½d. Boots Drug were 62s. 9d., and Beechams deferred firmed up further to 42s. 6d., Aspro to 48s. 1½d., and Griffiths Hughes were 37s. 6d. There was more business in shares of companies with plastics interests, British Xylonite being £8 5/16, with British Industrial Plastics 2s. shares 9s.

Despite the belief that drafting of the gas nationalisation Bill is almost completed, stocks and shares of gas companies were favoured on the view that they are undervalued; Gas Light and Coke improved to 23s. 1½d., with South Metropolitan stock up to 98½. Oil shares fluctuated, but were mostly slightly higher on balance. Burmah Oil were 72s. 6d. and Shell strengthened to 76s. 10½d. with the new shares at 15s. 6d. premium.

British Chemical Prices

Market Reports

THE industrial chemical market lost little time in returning to activity and the customary end of the year contraction in demand has been offset by export inquiries and pressure for items in short supply. Contract replacement buying is of more than usual interest owing to uncertainty with regard to the rates to be quoted in the New Year. Price alterations are not expected to be general but an upward trend for some items is regarded as inevitable. Reports indicate that deliveries to the chief consuming industries are going forward steadily and the improved fuel position should enable producers to enter into fresh commitments with a reasonable degree of confidence. A more hopeful note is also apparent in the coal tar products market where there is a steady outlet for any increased supplies. No official announcement has yet been made with regard to any change in the controlled rates.

MANCHESTER.—The Manchester chemical market during the past week has been noticeably under the influence of seasonal trading conditions. The holidays have had a marked effect on the volume of deliveries of the alkalis and other leading heavy products to the cotton textile and other using industries, although at the time of writing there are signs of a steady resumption of these, with the likelihood of more or less normal conditions being reached within the next few days. New business has, of course, been correspondingly affected. In all sections of the market the undertone so far as prices are concerned is extremely firm.

GLASGOW.—The approach of the holiday season resulted in a slackening of the busy conditions which have prevailed in the Scottish heavy chemical market recently. There have been no unusual demands and inquiries for materials for research purposes, which had declined, will probably return in full force after the new Year. There are indications that there will be increases in prices over a wide range of chemicals in the New Year. In the export market, conditions also have been quieter but about the usual number of orders have been received.

Canadian Gasoline Surveys

Resumed Publication After Seven Years

THE Canadian Bureau of Mines, Ottawa, has recently published two reports in its Memorandum Series (Nos. 93 and 94), giving the results of Gasoline Surveys for seven summers (1939-1946), and for five winters (1941-42—1945-46), respectively. Both surveys were made by Messrs. P. V. Rosewarne, H. McD. Chantler and P. B. Seely. The publication of these reports, which were formerly made annually by the Fuel Research Laboratories of the Fuel Division of the Bureau of Mines, were discontinued during the war, although periodical surveys were made of the quality of the gasoline sold during the war.

The reports contain details about the method of analysis employed, figures about the number of samples taken in several cities in the various Provinces, details about knock rating, volatility, vapour pressure, correlation of vapour and volatility, average sulphur content, gum content, gravity, corrosion and colour.

There was a decline for several years in the octane number as a result of the wartime shortage of tetraethyl lead. The lowest volatility was registered in 1944; the need to divert the more volatile fractions of the available crudes to the production of aviation fuel, synthetic rubber and solvents was, of course, responsible for this development.

Motor fuels with poor starting characteristics had inevitably to be used during the summers of 1944 and 1945. In 1943, 20 per cent of the samples taken exceeded the accepted limit of 7 mg. of gum per 100 mg. of motor fuel. The average specific gravity of the gasolines varied from a low of 0.733 in the summer of 1942 to a high of 0.743 in that of 1944, which corresponds to a variation in degrees A.P.I. from 61.5 to 58.9. The overall variation was from 0.703 to 0.764 or from 69.8 to 53.7 degrees A.P.I. None of the samples tested gave a positive test for corrosion.

While not revealing any novel developments in the field of gasoline performance, which is of great importance to the oil producer, oil chemist and motorist alike, the resumed publication of the results of these surveys is welcome. The figures given in the many tables that accompany the surveys will certainly be of value in achieving that improvement in gasoline quality which may confidently be expected in the years to come.

Reports on German and Japanese Industry

THESE reports have been written by teams of experts drawn from industry, Government departments and research establishments who were sent to Germany under the auspices, first, of the Combined Intelligence Objectives Sub-Committee and subsequently the British Intelligence Objectives Sub-Committee and its American counterpart, the Field Information Agency, Technical.

BIOS MISC. 39. Graphical representations of gas producer processes (2s.).

BIOS MISC. 40. "Schwingmetall"—a process for bonding rubber to steel used primarily for mountings to eliminate vibration (1s. 6d.).

BIOS 1210. Chemisch-Physikalische Versuchs Anstalt der Marine—Kiel—Germany. Fuels, Lubrication and Organisation. (3s. 6d.).

BIOS 1470. The layout of chemical factories (18s.).

BIOS 1501. Aspects of industrial medicine and hygiene in German chemical factories (7s. 6d.).

BIOS 1542. Wartime development in the design of pumps, vacuum pumps, compressors, steam traps. (1s. 6d.).

BIOS 1547. Manufacture of chalks, crayons and pastels in Germany. (4s.).

BIOS 1550. Sheathing of cables with aluminium. (2s. 6d.).

BIOS 1565. The manufacture of laminated tubes, cylinders and sheets and insulated sleevings at Elektro-Isolier-Industrie MBA. (1s.).

BIOS 1582. "Iganil" aniline-formaldehyde resin. (1s. 3d.).

BIOS/JAP/PR/826. Japanese fuels and lubricants. Research on rocket fuels of the hydrogen peroxide-hydrazine type (11s.).

BIOS/JAP/PR/887. Japanese use of temperature alloys in rocket, jet and gas

BIOS/JAP/PR/932. The aluminium industry of Japan. Part II. Light metal fabricating industry including copper and copper alloys (2s.).

BIOS/JAP/PR/1353. The light metals control association (2s.).

FIAT 977. Colour reproduction by colour photography. (6s.).

FIAT 1005. The Niers sewage disposal process. (3s. 6d.).

FIAT 1107. The manufacture of ethylene by reduction of acetylene. (2s. 6d.).

Classified List No. 8. Consolidated List under Subject headings of all reports on German and Japanese Industry published up to and including May 31, 1947. (1s.).

Classified List No. 9. June, 1947, supplement to the above list. (2d.).

Official Notices

Advertising Literature Cut.—The Board of Trade has issued the Control of Paper (No. 84) (Economy) Order, 1947, S.R. & O. 2717, which reduces the quantity of advertising circulars which may be distributed free of charge in any period of three consecutive months from 20 per cent to 10 per cent of the weight of such circulars distributed free of charge in the corresponding period of three months in the year which ended on August 31, 1939.

Tax Exemption.—The effect of a new Treasury order is to exempt from purchase tax domestic space heating appliances using small amounts of electricity to operate fans or pumps and to restore the basic rate of purchase tax of 50 per cent (instead of 75 per cent) on air conditioning appliances, humidifiers, filters, sprays, etc., not using electricity or gas as a source of heat.

Saccharine Content.—Among the provisions of the Soft Drinks Order, 1947, which comes into force on February 1, is the fixing of saccharine content of ready-to-drink beverages at 82 grs. for drinks for dilution ⅞ oz. The citric, or other, acid content is not regulated.

Prices of Oils and Fats.—The Minister of Food announces that no changes will be made in the prices of unrefined oils and fats and technical animal fats allocated to primary wholesalers and large trade users during the five weeks ending January 31, 1948.

Chemical Patents

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted may be obtained from the Patent Office, Southampton Buildings, London, W.C.2., at 1s. each.

Complete Specifications Open to Public Inspection

Photo-polymerisation of compounds containing the ethylene double bond.—E.I. Du Pont de Nemours & Co. March 16, 1946. 7123/1947.

Polymerisation of compounds containing the ethylenic double bond.—E.I. Du Pont de Nemours & Co. March 16, 1946. 7124-25/1947.

Production of alkylated phenols.—Firestone Tyre & Rubber Co. March 8, 1946. 35160/1946.

Manufacture of hydrocarbons.—Koppers Co., Inc. March 9, 1946. 27449/1946.

Froth flotation processes.—Koppers Co., Inc. March 15, 1946. 30023/1946.

Production of penicillin.—E. Lilley & Co. March 8, 1946. 22088/1946.

Pyrophoric alloys of zirconium and lead and method of producing same.—Metal Hydrides, Inc. Jan. 23, 1946. 18424-25/1947.

Production of metaldehyde.—Montecatini Soc. Generale per l'Industria Mineraria e Chimica. Aug. 1, 1944. 24123/1947.

Process for the preparation of new disazo dyestuffs.—Sandoz, Ltd. Jan. 14, 1946. 1142/1947.

Organic oxidation products and process of preparing the same.—J. R. Short Milling Co. March 18, 1946. 6859/1947.

Agents for the dispersion of solids, liquids and gases in an organic medium and method of using said agents.—Soc. Civile d'Etude des Brevets Hycar. March 5, 1946. 11994/1947.

Process for breaking down emulsions of water in petroleum and the like.—Soc. Civile d'Etude des Brevets Hycar. March 5, 1946. 11995/1947.

Primary and storage batteries containing organic liquids.—Soc. Civile d'Etude des Brevets Hycar. March 5, 1946. 11996/1947.

Lubricants.—Soc. Civile d'Etude des Brevets Hycar. March 5, 1946. 11997/1947.

Primary and storage batteries containing amine salts.—Soc. Civile d'Etude ces Brevets Hycar. March 5, 1946. 11998/1947.

Process for production of oxygenated sulphur compounds.—Standard Oil Co. Jan. 1, 1945. 23843/1947.

Radioactive metal products and method of manufacturing.—United States Radium Corporation. March 14, 1946. 7249/1947.

ANGLO-DANISH EXHIBITION

An exhibition of British goods will be held in Copenhagen from September 18 to October 3, 1948. H.M. The King and H.M. King Frederik of Denmark have consented to become patrons of the exhibition, which is being organised by the British Import Union of Copenhagen in consultation with the Federation of British Industries, and with the approval of the British and Danish Governments. The aim of the exhibition, for which buildings in the centre of Copenhagen have been reserved, is to encourage export trade to the Scandinavian and neighbouring markets.

It is intended that products of the engineering, chemical, building and associated industries will be displayed in the Forum exhibition building, the largest exhibition building n Copenhagen. Other sections will be housed elsewhere. Early application for space should be made to the Exhibition Committee, the British Import Union, Raadhuspladsen, 45, Copenhagen, stating the kinds of goods to be displayed and, where possible, the name of the agent in Denmark. Potential exhibitors can obtain further information from the British Import Union, Copenhagen, or from the London office of the Copenhagen Exhibition, Earls Court Exhibition Building, London, S.W.5.

New DDT Medium

A new DDT mixture, which promises to reduce the present heavy cost of spraying in Ceylon, is now being used by the Ministry of Health. The new mixture does away with the use of kerosene oil and is in the form of a watery emulsion with xylene and triton as the solvent. It is based on a similar mixture used by the U.S. health authorities and is stated to be as effective as DDT mixed with kerosene oil. Certain adjustments have been made to make it more suited to local conditions, however, and the experiments carried out with the new preparation have proved its merit.

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